IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appellants	:	Scott P. SCHREER
Serial No.	:	10/086,089
Filed	:	February 28, 2002
Title	:	SYSTEM AND METHOD FOR ACCESSING....
Examiner	:	Jason P. SALCE
Group Art Unit	:	2623
Confirmation No.	:	3357

BRIEF FOR APPELLANT

September 25, 2008

Mail Stop: Patent Appeal (Fee)
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

S I R:

Please note Customer No. 026304 and charge any fees, including any necessary extension fees, to Deposit Account 50-1290; pursuant to 37 C.F.R. 41.37, Applicant for patent herewith appeals to the Board of Patent Appeals from the Examiner's Decision, in the Official Action dated July 24, 2008, finally rejecting claims 1-11. The previously paid Notice of Appeal Fee and Appeal Brief Fee are requested to be applied to this Appeal Brief and accompanying Notice of Appeal.

REAL PARTY IN INTEREST

The real party in interest is Freeplay Music, Inc., a corporation having offices located at 630 Ninth Avenue, New York, New York 10026.

RELATED APPEALS AND INTERFERENCES

An Appeal Brief was filed April 17, 2008 in this matter. The Examiner subsequently reopened prosecution. No other appeals or interferences are known which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

STATUS OF CLAIMS

Claims 1-11 are pending. No claims are cancelled, withdrawn, or allowed. All claims stand rejected, and are being appealed herewith. The claims on appeal are set out in the Appendix.

STATUS OF AMENDMENTS

No amendment was filed in response to the Final Office Action dated December 27, 2007 (hereinafter "Final Office Action") finally rejecting all pending claims and the Office Action dated July 24, 2008 (hereinafter "July Office Action") reopening prosecution.

SUMMARY OF THE CLAIMED SUBJECT MATTER

Claim 1 (one of two independent claim)

The claimed invention is directed to a method of compensating at least one rights holder responsible for a digital audio recording file for the public performance of the content when the content is included in a public performance.

Under license agreements, songwriters, composers, lyricists and music publishers are legally entitled to receive royalty payments available to copyright owners. For a variety of reasons, including willful omission, compliance with such agreements is woefully inadequate. Thus, the present invention is directed to ensuring that copyright owners of audio works that are publicly performed via a broadcast over, but not limited to, radio or television to a plurality of audience

members are properly compensated for their efforts. Pg. 1, line 10 et al. of the specification as-filed; hereinafter 1:10 et al.

The method claimed in independent claim 1 includes eight (8) steps.

associating an identification with the digital audio recording file to produce an identified digital audio recording file;

The claimed features are described in the specification at least at 12:1 et al., and Fig. 5.

generating an identification record correlating the identification and the digital audio recording file;

The claimed features are described in the specification at least at 12:5 et al., and Fig. 5.

broadcasting the identified digital audio recording file as an audio signal in the public broadcast, . . .

The claimed features are described in the specification at least at 12:9 et al., and Fig. 5.

. . . the public broadcast being made by one of a radio, television, cable, satellite network and internet website, . . .

The claimed features are described in the specification at least at 1:16 et al., 2:3 et al., 9:14 et al.

. . . the public broadcast capable of being remotely receivable simultaneously by a plurality of audience members of the public capable of receiving the audio signal being publicly broadcast;

The claimed features are described in the specification at least at 1:10 et al., 1:14 et al., 1:19 et al., 2:3-5, 7:18-19, 8:16, 9:5, 12:01 et al., and Fig. 5.

receiving by a monitoring station the audio signal being publicly broadcast;

The claimed features are described in the specification at least at 1:10 et al., 1:14 et al., 1:19 et al., 2:3-5, 7:18-19, 8:16, 9:5, 12:9 et al., and Fig. 5.

feeding by said monitoring station the audio signal into monitoring means for detecting the identification;

The claimed features are described in the specification at least at 12:9 et al., and Fig. 5.

storing and correlating by said monitoring station the identification and data solely related to the public broadcast and unrelated to whether even any user constituting the audience members of the public have received the broadcast, based on the identification record as a batch file;

The claimed features are described in the specification at least at 12: 9 et al., and Fig. 5.

importing the batch file into a first database that catalogs public performance, based upon the incidence of the public broadcast and unrelated to the number of actual audience users of the audio signal, and

The claimed features are described in the specification at least at 13:1 et al., and Fig. 5.

using the first database to compensate the at least one rights holder.

The claimed features are described in the specification at least at 7:15 et al., 8:17 et al., and Fig. 5.

The claimed feature also find support the in the applications from which priority is claimed.

Claim 2

Claim 2 adds the additional feature that the identification is embedded in the audio signal as a digital watermark. The claimed features are described in the specification at least at 8:1 et al. This claim also finds support in the '874 application.

Claim 3

Claim 3 adds the additional feature of associating an identification is performed by encoding software. The claimed features are described in the specification at least at 12:9 et al., 12:19 et al. Fig. 5. This claim also finds support in the '874 application.

Claim 4

Claim 4 adds the additional feature that the identification is in the form of a non-audible digital signal that is not rendered inoperable by one or more generations of analog taping and broadcast compressions. The claimed features are described in the specification at least at 8:1 et al., 12:1 et al.. This claim also finds support in the '874 application.

Claim 5

Claim 5 adds the additional features of searching a second digital work library database to match the associated identification with the title of a digital audio work and its associated file information, and importing the title and associated file information from the second digital work library database into the first database. The claimed features are described in the specification at least at 14:14 et al. This claim also finds support in the '874 application.

Claim 6

Claim 6 adds the additional feature of using the associated identification to match the digital audio work's title to the recorded and stored transmission or broadcast related data and printing a digital audio work usage report having both the title of the digital audio work and the transmission and broadcast related data. The claimed features are described in the specification at least at 13:8 et al. This claim also finds support in the '874 application.

Claim 7

Claim 7 adds the additional feature that the digital audio recording file further comprises video or multimedia. The claimed features are described in the specification at least at 1:9 et al. This claim also finds support in the '874 application.

Claim 8

Claim 8 adds the additional feature that the first database is represented in the form of cue sheets. The claimed features are described in the specification at least at 9:14 et al.. This claim also finds support in the '874 application.

Claim 9 (second of two independent claims)

The claimed invention is directed to a method of compensating at least one rights holder responsible for a digital audio recording file for the public performance of the content when the content is included in a public performance.

Under license agreements, songwriters, composers, lyricists and music publishers are legally entitled to receive royalty payments available to copyright owners. For a variety of reasons, including willful omission, compliance with such agreements is woefully inadequate. Thus, the present invention is directed to ensuring that copyright owners of audio works that are publicly performed via a broadcast over, but not limited to, radio or television to a plurality of audience members are properly compensated for their efforts. Pg. 1, line 10 et al. of the specification as-filed; hereinafter 1:10 et al.

The method claimed in independent claim 9 includes the following steps.

> *receiving the publicly broadcast audio recording in a public broadcast as an audio signal,*

The claimed features are described in the specification at least at 1:10 et al., 1:14 et al., 1:19 et al., 2:3-5, 7:18-19, 8:16, 9:5, 12:9 et al., and Fig. 5.

> *the broadcast being made by one of a radio, television, cable, and satellite network and internet website,*

The claimed features are described in the specification at least at 1:16 et al., 2:3 et al., 9:14 et al.

> *the broadcast capable of being remotely receivable simultaneously by a plurality of audience members said receiving being done also by a monitoring station receiving the publicly broadcast signal;*

The claimed features are described in the specification at least at 1:10 et al., 1:14 et al., 1:19 et al., 2:3-5, 7:18-19, 8:16, 9:5, 12:9 et al., and Fig. 5.

feeding by said monitoring station the audio signal into a monitoring means to make an identification of the audio recording;

The claimed features are described in the specification at least at 12:9 et al., and Fig. 5.

storing and associating by said monitoring station the identification and data related to the public broadcast based on an identification record as a batch file;

The claimed features are described in the specification at least at 12: 9 et al., and Fig. 5.

importing by said monitoring station the batch file into a first database that catalogs the broadcast and the data related to the broadcast of the audio signal; and

The claimed features are described in the specification at least at 13:1 et al., and Fig. 5.

using by said monitoring station the first database to prepare cue sheets containing the data related solely to the performance when it is broadcast and unrelated to whether there is even any actual use by the receiving audience, to compensate the at least one rights holder.

The claimed features are described in the specification at least at 7:15 et al., 8:17 et al., and Fig. 5.

The claimed feature also find support the in the applications from which priority is claimed.

Claim 10

Claim 10 adds the additional feature of searching a second audio work library database to match the identification with the title of an audio work and its associated file information, and importing the title and associated file information from the second audio work library database into the first database. The claimed features are described in the specification at least at 14:14 et al. This claim also finds support in the '874 application.

Claim 11

Claim 11 adds the additional feature of using the identification to match the audio work's title to the recorded and stored broadcast related data and printing an audio work usage report having both the title of the digital audio work and the broadcast related data. The claimed features are described in the specification at least at 14:14 et al. This claim also finds support in the '874 application.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The application was filed on February 28, 2002 and claims the benefit of an earlier filing date under 35 U.S.C. §§120 as a continuation-in-part application U.S. Serial No. 09/736,874 filed December 14, 2000, now abandoned, and which claims priority from provisional application U.S. Serial No. 60/207,390 filed May 26, 2000, now expired.

The present application was filed with a single claim. In an Office Action dated December 23, 2003, the claim was provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of the co-pending '874 application. Claim 1, erroneously identified in the Office Action as claims 1-3 and 5-11, was also rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,253,193 to Ginter in view of U.S. Patent No. 6,148,335 to Haggard.

In response, Applicant amended claim 1, traversed the rejection based on the judicially created doctrine of obviousness-type double patenting, and presented new claims 2-11.

A Final Office Action issued September 27, 2004, rejecting claims 1-7 and 9-11 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,253,193 to Ginter in view of U.S. Patent No. 6,85,596 to Wiser in further view of U.S. Patent No. 6,345,100 to Levine. Claim 8 was rejected under 35 U.S.C. §103(a) with respect to the same references and in further view of non-patent literature BMI "What is a cue sheet." ("Cue Sheet")

An interview was conducted December 16, 2004 and an agreement was reached with respect to claim 1 and the prior art. A Request for Continued Examination (RCE) and a Response was filed on December 22, 2004, Applicant amended *inter alia* all independent claims, namely claims 1 and 9.

An Office Action was mailed on February 25, 2005 rejecting claims 1 and 9 under 35 U.S.C. §112, second paragraph and maintaining the prior rejections. A Response was filed on May 2, 2005 wherein Applicant amended all independent claims, namely claims 1 and 9. A further Action was issued July 25, 2005 and an interview was conducted on September 1, 2005. Further Actions issued December 20, 2005, June 9, 2006, November 20, 2006, and February 20, 2007, each followed by a suitable Response.

Although dependent claims 10 and 11 were inadvertently omitted from the last Response by the Applicant, these were never cancelled. Given the exhaustive prosecution on this application with respect to the same references, neither the Examiner, nor the U.S. Patent & Trademark Office, is disadvantaged by the inadvertent omission of claims 10 and 11.

Two declarations by one skilled in the art, Dr. Nasir Memon, ("Declaration" and "Supplemental Declaration"), were entered by the Examiner during prosecution of this application. Copies of these are enclosed.

A final Office Action issued December 27, 2007 and an Appeal Brief was filed. In an Office Action dated July 24, 2008, the Examiner has reopened prosecution including citing new art. The Examiner has indicated that Applicant may exercise the option of filing a new Notice of Appeal and Appeal Brief.

Accordingly, the present appeal is being filed seeking relief from the rejections and requests resolution

(a) whether or not claims 1 and 9 are indefinite under 35 U.S.C. §112, second paragraph with respect to *"based on the identification as a batch file;"*

(b) whether or not claim 1 is unpatentable is unpatentable under 35 U.S.C. §102(e) over U.S. Patent No. 6,574,594 to Pitman;

(c) whether or not claims 1-7 and 9-11 are unpatentable under 35 U.S.C. §103(a) over U.S. Patent No. 6,253,193 to Ginter in view of U.S. Patent No. 6,385,596 to Wiser; and

(d) whether or not claims 8 and 9 are unpatentable under 35 U.S.C. §103(a) over Ginter in view of Wiser in further view of non-patent literature BMI "What is a cue sheet." ("Cue Sheet").

No claims are cancelled, withdrawn, or allowed. Thus, the pending and finally rejected claims are claims 1-11 and are being appealed. The claims on appeal are set out in the Appendix.

ARGUMENTS WITH RESPECT TO THE REJECTION UNDER 35 U.S.C. §112, SECOND PARAGRAPH

The present appeal is being filed seeking relief from the rejections and requests resolution

(a) whether or not claims 1 and 9 are indefinite under 35 U.S.C. §112, second paragraph with respect to *"based on the identification as a batch file."*

The alleged limitation is not present in either claim 1 or 9.

Claim 1 recites *"based on the identification record as a batch file."* Emphasis added. Claim 1, lines 18-19. Claim 1 also includes the limitation of *"generating an identification record correlating the identification and the digital audio recording file,"* which places the limitation of *"based on the identification record as a batch file"* in proper context.

Claim 9 recites *"based on an identification record as a batch file."* Emphasis added. Claim 9, line 12. That limitation, however, is part of the larger limitation of *"storing and associating by said monitoring station the identification and data related to the public broadcast based on an identification record as a batch file,"* which places the prior limitation in proper context.

It is respectfully contended that the presently claimed invention is definite as required by 35 U.S.C. §112, second paragraph.

ARGUMENTS WITH RESPECT TO THE REJECTION UNDER 35 U.S.C. §102(E) OF CLAIM 1

The present appeal is being filed seeking relief from the rejections and requests resolution

> (b) whether or not claim 1 is unpatentable is unpatentable under 35 U.S.C. §102(e) over U.S. Patent No. 6,574,594 to Pitman.

Pitman '594 is cited for the teachings provided at 3:1-7, 4:25-30, 4:30-33, 4:34-50, 5:8-9, 5:11-36, and 5:41-65 within that reference.

Pitman '594 is a continuation-in-part application of U.S. Serial No. 09/803,298, now U.S. Patent No. 6,604,072. Both Pitman '594 and Pitman '072 claim priority to provisional patent application U.S. Serial No. 60/245,799.

A copy of the '799 provisional application, as obtained from PAIR, is enclosed as Appendix C. Therein, the subject matter relied on by the Examiner is not present in the provisional application. Moreover, the subject matter of relied on by the Examiner also is not present in Pitman '072. Thus, the date of the subject matter relied on by the Examiner is July 29, 2001, e.g., the filing date of Pitman '594.

In contrast, the claimed subject matter finds support in and claims priority to Applicant's own U.S. Serial No. 09/736,874 filed December 14, 2000, some seven months prior to the date of the cited art. A copy of the image file wrapper of the '874 application, as obtained from PAIR, is enclosed as Appendix D.

It is respectfully contended that the presently claimed invention is not anticipated by Pitman '594 under 35 U.S.C. 102 (e).

ARGUMENTS WITH RESPECT TO THE REJECTION UNDER 35 U.S.C. §103(A) OF CLAIMS 1-7 AND 9-11 AND ALSO TO THE REJECTION UNDER 35 U.S.C. §103(A) OF CLAIM 8

The present appeal is being filed seeking relief from the rejections and requests resolution

> (c) whether or not claims 1-7 and 9-11, are unpatentable under 35 U.S.C. §103(a) over U.S. Patent No. 6,253,193 to Ginter in view of U.S. Patent No. 6,385,596 to Wiser, and
>
> (d) whether or not claims 8 and 9 are unpatentable under 35 U.S.C. §103(a) over Ginter in view of Wiser in further view of non-patent literature BMI "What is a cue sheet." ("Cue Sheet").

With regard to claim 1, at essence is whether or not Ginter teaches the following step:

> *receiving by a monitoring station the audio signal being publicly broadcast;*

and,

in claim 9, whether or not Ginter teaches the similar step:

> *receiving the publicly broadcast audio recording in a public broadcast as an audio signal . . . said receiving being done also by a monitoring station receiving the publicly broadcast signal.*

In support that Ginter teaches the claimed steps, the Examiner first cites 3:24-33, which reads:

> *[Virtual Distribution Environment] can reliably detect and monitor the use of commercial information products. VDE uses a wide variety of different electronic information delivery means: including, for example, digital networks, digital broadcast, and physical storage media such as optical and magnetic disks. VDE can be used by major network providers, hardware manufacturers, owners of electronic information, providers of such information, and clearinghouses that gather usage information regarding, and bill for the use of, electronic information.*

In addition, the Examiner cites 147:50-60, which reads as follows:

> *In this example, record 1302 tracks usage access rights and/or other usage related activities during the present calendar month as well for the five immediately prior calendar months. Corresponding billing and/or billing method 406 may inspect the map, determine usage as related to billing and/or security monitoring for current usage based on a formula that employs the. usage data stored in the record, and updates the wide record to indicate the applicable array elements for which usage occurred or the like.*

Applicant respectfully disagrees and submits that in understanding whether or not Ginter teaches this step it is important to determine whether or not Ginter teaches a public broadcast.

Ginter defines a Virtual Distribution Environment as one that *"secures, administers, and audit electronic information use."* 2:24-27. In the first of his two expert declarations ("Memon 1", "Memon 2"), Professor Nasir Memon succinctly noted Ginter is essentially interested *"in buying and selling of media."* Memon 1, ¶ 9. Professor Memon more specifically identified that:

> *Ginter is concerned with transmitting information from a seller to a specific buyer and controlling the use of the information by the buyer. When Ginter refers to a broadcast, he refers to a specific communication between a seller and a particular user or buyer of the product which is transmitted within the container referred to as a VDE. Ginter is not interested in a public broadcast to multi-user's.* Memon 1, ¶ 9.

Professor Memon goes on to note that in the cited references of Ginter cited by the Examiner on this point (Memon 1, ¶13-14, Memon 2, ¶ 7) that

> *"there is no teaching of monitoring the public broadcast transmitted by a sender regardless of whether any user receives the information or not. All of these broadcast or any reference to the transmission of information relates to the user associated with the sender and essentially monitoring the user's receiving the information rather than the sender sending the information. "* (Emphasis added).

In other words, nothing in Ginter suggest the step of receiving by a monitoring station the audio signal being publicly broadcast. The significant aspect of the presently claimed invention is that the monitoring takes place after the public broadcast is made. Documenting the actual received public broadcast - rather than what may be intended to be broadcast - yields different information and more importantly can be relied on for other purposes, such as compensation of artists.

As such, it is immaterial whether anyone else is tuned in and whether there is even a single user receiving the broadcast, or whether a particular user has requested and downloaded the broadcast, the fact that it has been broadcast is sufficient for the present invention. The presently claimed invention receives that broadcast after it has been broadcast publicly regardless of whether any other user has requested or received it. However, the physical location of the monitor of the present invention is not significant so long as it is located in order to receive the broadcast.

In the Office Action of Dec. 27, 2007, pg. 2, ¶ 2-3, the Examiner disagrees with the above arguments and notes that *"as the claims are currently written, monitoring could be performed at the user's location, an intermediate location in the network, or the actual broadcast server."* The Examiner states further that it is inherent in a public broadcast that a user requests or receives, e.g., by tuning into, the broadcast.

Applicant respectfully disagrees. A public broadcast and the broadcast of Ginter are different. As Professor Memon had pointed out *"Ginter refers to a specific communication between a seller and a particular user or buyer of the product which is transmitted within the container referred to as a VDE."* Without a user's request, there is no broadcast in Ginter. There may be a broadcast to someone else, but, similarly, without the second user's request the broadcast does not occur.

Thus, regardless where the Ginter device is placed, *"the user's location, an intermediate location in the network, or the actual broadcast server,"* a user request must be made to a broadcast server in order for the user to receive the broadcast and for Ginter to allegedly monitor it.

In the presently claimed invention, the public broadcast occurs without regard to whether a listener is listening, let alone has made a request for *"the broadcast."* In other words, a public broadcast is passive to the listener. All listeners may have suffered a power outage and not been able to listen or, conversely, all listeners may have tuned in. It does not matter for the presently claimed invention. The presently claimed invention stands in the shoes of any listener. Whether or not the public broadcast happens based on the broadcaster's own volition is the only determining factor. Once it does, the presently claimed invention performs the step of *"receiving by a monitoring station the audio signal being publicly broadcast"* in order to compensate a rights holder.

In contrast to the presently claimed invention, without a user's request, there is no broadcast in Ginter. In the presently claimed invention, public broadcast is claimed as being one of a radio, television, cable, satellite network, and internet website and is capable of being remotely receivable simultaneously by a plurality of audience members of the public capable of receiving the audio signal. The broadcast of Ginter does not encompass these aspects.

It is respectfully contended that the presently claimed invention clearly distinguishes over the references.

CONCLUSION

For the foregoing reasons, the final rejection of the claims should be reversed.

FEES

To the extent necessary, applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-1290, and please credit any excess fees to said deposit account.

Respectfully submitted,

__/Hassan A. Shakir/____

Hassan A. Shakir
Reg. No. 53,922
212.940.6489

CUSTOMER NUMBER 026304
Direct Phone: (212) 940-8683
Docket: 058201-00050

CLAIMS APPENDIX

1. A method of compensating at least one rights holder responsible for content of a digital audio recording file for the public performance of the content, the content being included in a public broadcast, the method comprising the steps of:

associating an identification with the digital audio recording file to produce an identified digital audio recording file;

generating an identification record correlating the identification and the digital audio recording file;

broadcasting the identified digital audio recording file as an audio signal in the public broadcast, the public broadcast being made by one of a radio, television, cable, satellite network and internet website, the public broadcast capable of being remotely receivable simultaneously by a plurality of audience members of the public capable of receiving the audio signal being publicly broadcast;

receiving by a monitoring station the audio signal being publicly broadcast;

feeding by said monitoring station the audio signal into monitoring means for detecting the identification;

storing and correlating by said monitoring station the identification and data solely related to the public broadcast and unrelated to whether even any user constituting the audience members of the public have received the broadcast, based on the identification record as a batch file;

importing the batch file into a first database that catalogs public performance, based upon the incidence of the public broadcast and unrelated to the number of actual audience users of the audio signal, and

using the first database to compensate the at least one rights holder.

2. The method of claim 1, wherein the identification is embedded in the audio signal as a digital watermark.

3. The method of claim 1, wherein the step of associating an identification is performed by encoding software.

4. The method of claim 1, wherein the identification is in the form of a non-audible digital signal that is not rendered inoperable by one or more generations of analog taping and broadcast compressions.

5. The method of claim 1, further comprising the steps of searching a second digital work library database to match the associated identification with the title of a digital audio work and its associated file information, and importing the title and associated file information from the second digital work library database into the first database.

6. The method of claim 5, further comprising the step of using the associated identification to match the digital audio work's title to the recorded and stored transmission or broadcast related data and printing a digital audio work usage report having both the title of the digital audio work and the transmission and broadcast related data.

7. The method of claim 1, wherein the digital audio recording file further comprises video or multimedia.

8. The method of claim 1, wherein the first database is represented in the form of cue sheets.

9. A method of compensating at least one rights holder responsible for content of a digital audio recording based solely on performance fees generated by the public broadcast of the content, the method comprising the steps of:

receiving the publicly broadcast audio recording in a public broadcast as an audio signal, the broadcast being made by one of a radio, television, cable, and satellite network and internet website, the broadcast capable of being remotely receivable simultaneously by a plurality of audience members said receiving being done also by a monitoring station receiving the publicly broadcast signal;

feeding by said monitoring station the audio signal into a monitoring means to make an identification of the audio recording;

storing and associating by said monitoring station the identification and data related to the public broadcast based on an identification record as a batch file;

importing by said monitoring station the batch file into a first database that catalogs the broadcast and the data related to the broadcast of the audio signal; and

using by said monitoring station the first database to prepare cue sheets containing the data related solely to the performance when it is broadcast and unrelated to whether there is even any actual use by the receiving audience, to compensate the at least one rights holder.

10. The method of claim 9, further comprising the steps of searching a second audio work library database to match the identification with the title of an audio work and its associated file information, and importing the title and associated file information from the second audio work library database into the first database.

11. The method of claim 10, further comprising the step of using the identification to match the audio work's title to the recorded and stored broadcast related data and printing an audio work usage report having both the title of the digital audio work and the broadcast related data.

(ix) Evidence Appendix

Two declarations by Dr. Nasir Memon ("Memon 1" and "Memon 2") were entered by the Examiner during prosecution of this application. Copies of these as well as Dr. Memon's Curriculum Vitae are enclosed as Appendices A and B, respectively.

A copy of U.S. Serial No. 60/245/799 to Pitman is enclosed as Appendix C.

A copy of Applicant's own priority application is enclosed as Appendix D.

(x) Related Proceedings Appendix

No other appeals or interferences are known which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

Appendix A
Memon 1

Attorney Docket No.: 3247/NJJ (058201-00050)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor:	SCOTT P. SCHREER
Confirmation No.	3357
Serial No.:	10/086,089
Filed:	February 28, 2002
Title:	IMPROVED SYSTEM AND METHOD FOR ACCESSING....
Examiner:	Jason P. Salce
Group Art Unit:	2611

October 12, 2006

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22314-1450

DECLARATION UNDER RULE 1.132

I, Nasir Memon hereby declare as follows:

1. I am currently Professor, Computer and Information Science Department at Polytechnic University where I have served in this capacity since 2004. Prior to this I was Associate Professor at this University for six years. Previously, I had been a visiting faculty at the Imaging Technology Department of Hewlett Packard Research Labs. I have also been Assistant Professor at Northern Illinois University, Arkansas State University and Research Assistant at University of Nebraska.

2. I hold a PhD in Computer Science from the University of the Nebraska, an MS in Computer Science from the University of Nebraska, as well as a M.Sc. in mathematics from

Birla Institute of Technology and Science in India, and a Bachelor of Engineering from Birla Institute of Technology and Science in India.

3. I have previously served as a testifying expert in the field of Multimedia Digital Rights Management, Digital Watermarking, and Digital Forensics. In these fields I qualified for government grants and provided consultancy on information security, coding and steganography to the military. I have frequently lectured and headed standards committees in this area.

4. I have received numerous awards, various US Patents, have published articles and book chapters in extremely large number of journal publications and conference publications. I have chaired numerous committees, and am considered an expert in the field of digital rights management.

5. A copy of my CV is attached.

6. I have reviewed the present patent application serial number 10/086,089 which was published as US Patent Application Publication No. 2002/0080976 on June 27, 2002 (hereinafter "Schreer"). I have also reviewed the final office action issued by the United States Patent and Trademark Office dated June 9, 2006 as well as the previous office action issued by the United States Patent Office dated December 20, 2005 and the response submitted by the inventor dated March 20, 2006. I have also reviewed two references relied on by the examiner. Specifically, US Patent 6,253,193 issued to Ginter et al. (hereinafter "Ginter"), and US Patent 6,385,596 issued to Wiser et al. (hereinafter "Wiser"). I have also focused on the claims submitted by the inventor, Scott Schreer in his amendment of March 20, 2006.

7 For the specific reasons as stated hereinafter, as one skilled in the art, I do not believe that independent claims 1 and 9 are obvious over the teachings of Ginter in view of Wiser. I further believe that many of the claims dependent upon claims 1 and 9 are also not obvious over

the combination of these references. Furthermore, it is my opinion that one skilled in the art reading Schreer would find adequate support for the recitations in claims 1-9.

8. Schreer describes a method of compensating at least one rights' holder responsible for the content of a digital audio recording file, for the public performance of the content which is included in a public broadcast. Schreer essentially picks up the broadcast when it is being sent by the sender. He provides for a monitoring station that receives the broadcast just as one of the members of the public would receive it. Based upon such public broadcast, it recognizes that the sender has publicly broadcast the particular performance and credits the rights holder through the use of a compensation method.

9. Ginter is essentially interested in buying and selling of media. He describers a system, referred to as a "Virtual Distribution Environment" (VDE) which regulates, monitors and controls all information transmitted. (See column 6, lines 32 - 57). Ginter deals with interactions between the seller of the information which is transmitted within the VDE and the buyer which receives the information. Ginter is essentially interested in an area of commerce which is different from that of Schreer. The entire domain and area being addressed is substantially different. (See column 3, lines22 – 33, column 9 lines 35 - 61).

Ginter is concerned with transmitting information from a seller to a specific buyer and controlling the use of the information by the buyer. When Ginter refers to a broadcast, he refers to a specific communication between a seller and a particular user or buyer of the product which is transmitted within the container referred to as a VDE. Ginter is not interested in a public broadcast to multi-user's.

Ginter monitors the specific receiving by the user. Any sending of the information is only monitored at the receiving end by the user.

In Schreer, he is interested in monitoring the information based upon its being sent.

10. A clear way of understanding the distinction is that in Schreer once the information is broadcast, even if no user has his receiver on and no one actually receives the particular music or information being broadcast, there is still a monitoring and recording of the fact that the music or other information has been broadcast, based upon the fact that the sender has broadcast the information. Thus, even if no one is actually receiving and using it, it will still be counted as a broadcast.

In Ginter, on the other hand, if there is no specific user who has requested the information and is actually receiving it, there will be absolutely no recording of the information.

11. Although Ginter mentions and allows broadcast of information, the business models and systems he describes essentially involve monitoring the consumption of a broadcast at the user end. Applying Ginters teaching to the problem addressed by Schreer will require having a user agent with every single user that receives the broadcast content and report back to the server, Schreer elegantly solves this problem by simply monitoring the broadcast and charging the sender based on content broadcast. So only one monitoring station is needed per broadcast domain as opposed to one per user as taught by Ginter. None of the examples or figures of Ginter anticipate the solution described by Schreer,

Schreer is not user specific to the extent that a particular user has to request the information. It does not monitor the number of users involved. It does not monitor whether there is even a single user. On the other hand, it monitors the fact that the sender has publicly broadcast this information, and the monitoring station just picks this up just as it would an end user picking up a public broadcast.

12. Wiser teaches how to control the use of a performance that a user received, by restricting him so that he won't pass it on. Wiser again monitors the user receiving the information and how he makes use of it. Wiser has no ability to monitor the sending or transmission or public broadcast of the information.

13. I have specifically reviewed particular paragraphs of Ginter that were identified by the examiner in the various office actions mentioned above. Specifically, I reviewed col. 3, line 28; col. 14, line 5-28; col. 18, lines 12-13; col. 3 lines 34-35; col. 23, lines 51-59; col. 3, lines 20-24; col. 4, lines 8-13; col. 4, lines 17-20; col. 3, lines 24-29; col. 260, lines 11-15; col. 58, lines 43-46 and lines 59-64; Fig. 20; col. 53, lines 32- col 154, lines 67;col. 127, lines 6-8; col 53, lines 1-10, col. 14, lines 5-10; col. 18, lines 60-64; col. 127, lines 45-49; col. 153, lines 53-59; col. 153, lines 62-64; col. 155, lines 22-23; Fig. 16; col. 152, lines 26-27; col. 9, lines 35-60; col. 130, lines 7-11; col. 58, lines 43-46 and lines 59-64, col. 7, lines 51-52; col. 153, lines 32-col. 154, line 49; col. 127, lines 6-8; col. 53, lines 1-10; col. 14, lines 5-10; col. 18, lines 60-64; col. 127, lines 45-49; col. 153, lines 53-59 and 62-64; Fig. 16; col. 155, lines 22-23; col. 152 lines 26-27; col. 3 lines 20-24; col. 4, lines 8-18.

14. In all of the above, there is no teaching of monitoring the public broadcast transmitted by a sender regardless of whether any user receives the information or not. All of these broadcast or any reference to the transmission of information relates to the user associated with the sender and essentially monitoring the user's receiving the information rather than the sender sending the information.

15. I have also reviewed the Wiser reference and specifically including col. 23, lines 18-19; col. 11, lines 53-55; col. 23, lines 21-30 and col. 11, lines 55-57. Again, nothing at Wiser

provides any teaching that there is any monitoring at the occurrence of a sending of a broadcast, regardless of whether there is any receipt of it.

16. I also reviewed Schreer and I believe that the claims that were submitted with the Schreer Amendment of March 20, 2006, would be understood by one skilled in the art as being taught by Schreer. Specifically, I refer to the material covered in paragraph 0044, paragraphs 0002 and 0003; paragraph 0004; paragraph 0007; paragraph 0023; paragraph 0026; and paragraph 0028.

17. All of the above teach one skilled in the art that we are dealing with a public broadcast to users who typically receive radio or television broadcast signals of music in the like.

18. Furthermore, paragraph 0044 refers to a monitoring means, and its use therein and elsewhere provides one skilled in the art the additional information that the monitoring means is receiving the broadcast just as an end user would receive it who is listening to the broadcast that is publicly being sent out.

19. Accordingly, it is my belief that the invention as claimed in the Schreer Amendment of March 20, 2006, including independent claims 1 and 9 are neither, anticipated by the Ginter or Wiser nor would they be obvious taking the combination of both of them together. I believe that they are both teaching away from the Scheer invention and neither of them are providing any teaching of monitoring of the sender by means of receiving a signal that is broadcast in the usual manner of a public broadcast, and compensating the rights owner based upon such receipt of materials sent.

20. Furthermore, I believe that the claims in the Scheer Amendment of March 20, 2006 are adequately supported by Schreer and one skilled in the art would be taught the claims from reading the specification as I reviewed.

21. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

10/12/06
Date:

Nasir Memon

Curriculum Vitae - Nasir Memon

Personal

Computer Science Department
Polytechnic University
Brooklyn, NY 11201
Phone: 718-260-3970
Fax: 718-260-3609
memon@poly.edu

Education

Ph.D. Computer Science, University of Nebraska-Lincoln, August 1992,
Graduate Advisor: S. Magliveras and K. Sayood,
Dissertation Title: "Image Compression Using Efficient Scan Patterns."
M.S. Computer Science, University of Nebraska-Lincoln, May 1989,
Thesis Advisor: S. Magliveras,
Thesis Title: "On logarithmic signatures and applications."
M.Sc. Mathematics, Birla Institute of Technology and Science, Pilani, India, 1982.
B.E. Chemical Engineering, Birla Institute of Technology and Science, Pilani, India, 1982.

Research Interests

Data Compression, Image Processing, Computer and Network Security, Multimedia Communication and Security, Digital Forensics, Steganography.

Professional Experience

Professor, Computer and Information Science Department, Polytechnic University, September 2004 to present.

Associate Professor, Computer and Information Science Department, Polytechnic University, August 1998 to August 2004.

Visiting Faculty, Imaging Technology Department, Hewlett Packard Research Labs, August 1997 to August 1998.

Assistant Professor, Computer Science Department, Northern Illinois University, August 1994 to June 1998.

Assistant Professor, Computer Science and Mathematics Department, Arkansas State University - August 1992 to 1994.

Research Assistant/Teaching Assistant, Computer Science and Engineering Department, University of Nebraska, January 1987 to May 1992.

Systems Engineer, Sigma Solvents Pvt. Ltd., Bombay, India, January 1982 to August 1986.

Awards and Patents

Jacobs Excellence in Education Award. Polytechnic University, 2002.

ISO/IEC Certificate of Appreciation. International Standards Organization, 2002.

NSF CAREER Award, *Lossless, Near-lossless and Lossy Plus Lossless Image Compression*, 1997.

US Patent 5903676, X. Wu and N. Memon, *Context-based, Adaptive, Lossless Image Codec.*

US Patent Application, D. Bhattacharjee, N. Memon and Amir Said, *Segmentation of Compound Documents*, pending approval.

US Patent Application, N. Memon and D. Tretter, *A Simple Variable Quantization Technique for JPEG Part 3.* Pending approval.

US Patent Application, G. Naumovich, N. Memon, H. Yu and M. Sosonkin. *Obfuscation by Class Coalescence*, pending approval.

US Patent Application, D. Buschsmith, N. Memon and R. Fish. *Secure Content Access Utilizing Authentication, Encryption and Firewall Technologies for Home Gateways.*

US Patent Application, K. Shanmugasundaram, N. Memon and H. Bronniman. *Pay load attribution System.* Pending Approval.

US Patent Application, M. Kharrazi, N. Memon and K. Shanmugasundaram. *Network Abuse Detection System.* Pending Approval.

US Patent Application, A. Pal, N. Memon and K. Shanmugasundaram. *Method for Evidence Reassembly.* Pending Approval.

Publications

Book Chapters and Magazine Articles

1. S. Forchammer and N. Memon. Lossless Image Compression. *Document and Image Compression.* M. Barni and F. Bartoloni, editors. To appear 2005.
2. M. Chen, N. Memon and E. Wong. Binary Image Watermarking. *Multimedia Security: Steganography and Digital Watermarking Techniques for Protection of Intellectual Property*, Idea Group Publishing, To appear July 2004.
3. R. Chandramouli and N. Memon. Image Steganalysis. *Optical and Digital Techniques for Information Security*, Springer Verlag, December 2003.
4. M. Ramkumar and N. Memon. Making a Mark. *Optical Engineering Magazine*, PP 20-23, January 2003.
5. T. Suel and N. Memon. Algorithms for Delta Compression and Remote File Synchronization. *Handbook of Lossless Image Compression*, CRC Press, 2002.
6. R. Chandramouli, N. Memon, M. Rabbani. Digital Watermarking. *Encyclopedia of Imaging Science and Technology.* J. Hornak, Editor. John Wiley, October 2001.

7. R. Ansari and N. Memon. The JPEG Standard. *Handbook of Image and Video Processing*, A. Bovik, Editor, Academic Press, 2000. Second Edition 2005.

8. R. Ansari and N. Memon. The JPEG Lossless Compression Standards. *Handbook of Image and Video Processing.* A. Bovik, Editor, Academic Press, 2000. Second Edition 2005.

9. D. Tretter, N. Memon and C. Bouman. Multispectral Image Compression. *Handbook of Image and Video Processing.* A. Bovik, Editor, Academic Press, 2000. Second Edition 2005.

10. K. Sayood and N. Memon. Lossless Compression. In *Handbook of Communications.* J. Gibson, Editor, CRC Press, 1996. Second Edition 2001.

11. N. Memon and K. Sayood. Facsimile Compression. In *Handbook of Communications.* J. Gibson, Editor, CRC Press, 1996. Second Edition 2001.

Journal Publications

1. I. Avcibas, M. Kharrazi, N. Memon and B. Sankur. Image steganalysis using binary similarity measures. Accepted for publication. *EURASIP Journal of Applied Signal Processing*, March 2005.

2. J. Zambreno, A. Choudhary, R. Simha, N. Memon. SAFEOPS: An approach to embedded software security", ACM Transactions on Embedded Systems, Feb. 2005.

3. Anandabrata Pal and Nasir Memon. Automated reassembly of file fragmented images using greedy algorithms. Accepted for publication, *IEEE Transactions on Image processing*, January 2005.

4. Perceptual Audio Hashing Functions. H. Ozer, B. Sankur, N. Memon and E. Anarim. Accepted for publication *EURASIP Journal of Applied Signal Processing.* March 2005.

5. S. Weidenbeck, J. Waters. J. C. Birget, A. Brodskiy and N. Memon. PassPoints: Design and Evaluation of a Graphical Password System. To appear in *International Journal of Human-Computer Studies for the Special Issue on Usable Privacy and Security.* May 2005.

6. J. C. Birget, D. Hong and N. Memon. Robust discretization, with an application to graphical passwords. Submitted to *IEEE Transactions on Information Forensics and Security*, 2005.

7. M. Ramkumar and N. Memon. An Efficient Key Pre-Distribution Scheme for Ad-Hoc Network Security. *IEEE Journal on Selected Areas in Communication.*, 23(3):611-621, March 2005.

8. R. Radhakrishnan, M. Kharrazi and N. Memon. Data Masking: A New Approach for Data Hiding? *Journal of VLSI Signal Processing Systems*, Accepted for Publication, 2004.

9. R. Radhakrishnan, Y. Xiong and N. Memon. On the Security of Visual Hash. *Journal of Electronic Imaging*, Accepted for Publication, 2004.

10. D. Chen, Y-J Chiang, N. Memon and X. Wu. Optimal Alphabet Partitioning for Semi-Adaptive Coding. *IEEE Transactions on Communications*, Accepted for Publication, 2003.

11. I. Avcibas, N. Memon, B. Sankur, K. Sayood. A Progressive Lossless/Near-Lossless Image Compression Algorithm. *IEEE Transactions on Communications*, Accepted for Publication, 2003.

12. V. Padman, N. Memon, P. Frankl and G. Naumovich. Design and Implementation of an Information Security Laboratory. *Journal of Information Warfare*, Volume 2, Issue 3, July 2003.

13. G. Naumovich, N. Memon. Preventing Piracy, Reverse Engineering and Tampering. *IEEE Computer*, 36(7):64-71. July 2003.

14. P. Wong and N. Memon. Image Processing for Half-tones, *IEEE Signal Processing*, 20(4):59-70, July 2003.

15. R. Chandramouli and N. Memon. On Sequential Watermark Detection. *IEEE Transactions on Signal Processing*. 51 (4):1034-1044, April 2003.

16. I. Avcibas, N. Memon, B. Sankur. Steganalysis using Image Quality Metrics. *IEEE Transactions on Image Processing*, 12(1): 221-229, February 2003.

17. R. Radhakrishnan , N. Memon On the Security of the SARI Image Authentication System. *IEEE Transactions on Circuits and Systems for Video Technology*, 12(11):1030-1033, November 2002.

18. J. Fridrich, M. Goljan and N. Memon. Cryptanalysis of the Yeung-Mintzer Fragile Watermarking Technique. *Journal of Electronic Imaging*, 11(02), 262-274, April 2002.

19. I. Avcibas, N. Memon, B. Sankur, K. Sayood. A Progressive Lossless/Near-Lossless Image Compression Algorithm. *IEEE Signal Processing Letters*, 9(10):312-314, February 2002.

20. K. Gopalakrishnan, N. Memon and P. Vora. Protocols for Watermark Verification. *IEEE Multimedia*, 8(4):66-70, October 2001.

21. P. Wong and N. Memon. Secret and Public Key Image Watermarking Schemes for Image Authentication and Ownership Verification. *IEEE Transactions on Image Processing*, 10(10): 1593-1601, October 2001.

22. N. Memon and P. Wong. A Buyer-Seller Watermarking Protocol. *IEEE Transactions on Image Processing*, 10(4):643-649, April 2001.

23. N.Memon, D. Neuhoff and S. Shende. On Scanning Techniques for Context-based Lossless Image Compression. *IEEE Transactions on Image Processing*, 9(11):1837 - 1848, November 2000.

24. X. Wu and N. Memon. Context-Based Lossless Interband Compression - Extending CALIC. *IEEE Transactions on Image Processing*, 9(6):982-993, June 2000.

25. M. Holliman and N. Memon. Counterfeiting Attacks and Blockwise Independent Watermarking Techniques. *IEEE Transactions on Image Processing*, 9(3):432-441, March 2000.

26. N.Memon, X. Kong and J. Cinkler. Context-based Lossless and Near-lossless Compression of EEG Signals. *IEEE Transactions on Information Technology in Biomedicine*, 3(3):231-238, September, 1999.

27. N. Memon and P. Wong. Digital Watermarks: Protecting Multimedia Content. *Communications of the ACM*, 47(7):35-43, July 1998.

28. R. Ansari, N. Memon and E. Ceran. Near-lossless Image Compression Techniques. *Journal of Electronic Imaging*, 7(3):486-494, July 1998.

29. S. Craver, N. Memon, B. Yeo and M. Yeung. Resolving Rightful Ownership with Invisible Watermarking Techniques: Limitations, Attacks, and Implications. *IEEE Journal on Selected Areas in Communications*, 16(4):573-586, May 1998.

30. N. Memon. A 2-D Vector Excitation Coding Technique with Prediction Patterns. *Signal Processing*, 67(2):163-172, March 1998.

31. N. Memon and X. Wu. Recent Developments in Lossless Image Compression. *The Computer Journal*, 40(1):117-126, June 1997.

32. N. Memon and R. Rodila. Transcoding GIF images to JPEG-LS. *IEEE Transactions on Consumer Electronics*, 43(3):423-429, June 1997.

33. X. Wu and N. Memon. CALIC - A Context-based, Adaptive, Lossless Image Coding Scheme. *IEEE Transactions on Communications*. 45(4):437–444, April 1997.

34. N. Memon and V. Ayalur. Optimal Re-ordering of Color Maps for Lossless Image Compression. *IEEE Transactions on Image processing*, 5(11):1522-1527, November 1996.

35. N. Memon and K. Sayood. Lossless Compression of Video Sequences. *IEEE Transactions on Communications*, 44(10)1340:1345, October, 1996.

36. N. Memon and K. Sayood. Scan Predictive Vector Quantization of Multi-spectral Images. *IEEE Transactions on Image Processing*, 5(2):330-337, February 1996.

37. N. Memon, K. Sayood, and S. Magliveras. Lossless Image Compression with a Codebook of Block Scans. *IEEE Journal on Selected Areas in Communications*, 13(1):24–31, January 1995.

38. N. Memon and K. Sayood. Lossless Image Compression of RGB Color Images. *Optical Engineering*, 34(6):1711–1717, June 1995.

39. N. Memon, K. Sayood, and S. Magliveras. Lossless Compression of Multi-spectral Image Data. *IEEE Transactions on Geosciences and Remote Sensing*, 32(2):282–289, March 1994.

40. N. Memon, K. Sayood, and S. Magliveras. A Simple Technique for Enhancing the Performance of Lossy Plus Lossless Image Compression Schemes. *Journal of Electronic Imaging*, 2(3):245–252, 1993.

41. S. Magliveras, N. Memon, and K. Sayood. Tree Codes for Lossless Image Compression. *Congressus Numerantium*, 95:117–130, 1993.

42. S. Magliveras and N. Memon. Algebraic Properties of Cryptosystem PGM. *Journal of Cryptology*, 5:167–183, 1992.

43. S. Magliveras and N. Memon. Complexity Tests for Cryptosystem PGM. *Congressus Numerantium*, 79:61–68, 1990.

44. S. Magliveras and N. Memon. Linear Complexity Profile Analysis of the PGM Cryptosystem. *Congressus Numerantium*, 72:51–60, 1989.

Conference Publications

1. Source camera identification based on CFA interpolation, S. Bayram, H. T. Sencar, N. Memon, *ICIP - International Conference on Image Processing*, Genoa, Italy, September 2005.

2. D. Chen, Y-J Chiang, N. Memon, X. Wu. Geometry Compression of Tetrahedral Meshes Using Optimized Prediction. Accepted for presentation, *EUSIPCO - European Signal Processing Conference*, Turkey, September 2005.

3. Sevinc Bayram, Ismail Avcibas, Bulent Sankur, Nasir Memon Image manipulation detection with binary similarity measures. Accepted for presentation, *EUSIPCO - European Signal Processing Conference*, Turkey, September 2005.

4. Y. Sutcu. T. Sencar and N. Memon. A Secure Biometric Authentication Scheme Based on Robust Hashing. *ACM Multimedia Security Workshop*, New York, August 2005.

5. S. Weidenbeck, J. Waters. J. C. Birget, A. Brodskiy and N. Memon. Authentication Using Graphical Passwords: Effects of Tolerance and Image Choice. *ACM Symposium on Usable Privacy and Security*, Pittsburg, July 2005.

6. V. Padman and N. Memon. Design of a Virtual Laboratory for Information Assurance Research and Education. *National Colloquium for Information Systems Security Education.* Atlanta, July 2005.

7. D.Chen, Y.-J. Chiang, N. Memon, and X. Wu. Optimized Prediction for Geometry Compression of Triangle Meshes. *Proceedings of Data Compression Conference*, pp 83-92, Utah, March 2005.

8. 11. M. Ramkumar, N. Memon, KPI: A Security Infrastructure for Trusted Devices, Pre-Conference Workshop, *12th Annual Network and Distributed System Security Symposium*, San Diego, California, February 2005.

9. K. Shanmugasundaram, N. Memon and H. Broinniman. Integrating Forensic Support in the Network *Digital Forensics Worshop*, Orlando, February 2005.

10. M. Kharrazi, T. H. Sencar, N. Memon. Benchmarking steganographic and steganalysis techniques, *Security and Watermarking of Multimedia Contents*, San Jose, CA, January 16-20, 2005.

11. K. Petrowski, M. Kharrazi, H. T. Sencar, N. Memon. PSteg: steganographic embedding through patching, *IEEE International Conference on Acoustics, Speech, and Signal Processing* ,March, 2005.

12. M. Ramkumar, N. Memon, A DRM Based on Renewable Broadcast Encryption, to be presented at the Visual Communications and Image Processing (VCIP) Conference, Beijing, China, July 2005.

13. M. Ramkumar, N. Memon, KPI: A Security Infrastructure for Trusted Devices, Pre-Conference Workshop, 12th Annual Network and Distributed System Security Symposium, San Diego, California, February 2005

14. M. Kharrazi, K. Shanmugasundaram and N. Memon. Nabs: A System for Detecting Resource Abuses via Characterization of Flow Content Type, *ACSAC - Annual Computer Security Applications Conference*, Tucson, Arizona, November 2004.

15. Blind Source Camera Identification, M. Kharrazi, H. T. Sencar, and N. Memon. *ICIP - International Conference on Image Processing*, Singapore, September 2004.

16. I. Avcibas, S. Bayram, N. Memon, M. Ramkumar, B. Sankur. A Classifier Design for Detecting Image Manipulations, *ICIP - International Conference on Image Processing*, Singapore, September 2004.

17. H. Ozer, B. Sankur, and N. Memon. Robust Audio Hashing for Audio Identification. *EUSIPCO - European Signal Processing Conference*, October 2004.

18. M. Ramkumar, N. Memon. An Efficient Random Key Pre-distribution Scheme, In proceedings of *Globecom 04*, November 2004.

19. Y. Zhang, M. Ramkumar and N. Memon. Information Flow Based Routing Algorithms for Wireless Sensor Networks. In proceedings of *Globecom 04*, November 2004.

20. K. Shanmugasundaram, H. Broinnimann and N. Memon. Payload Attribution via Hierarchical Bloom Filters, 11th ACM Conference on Computer and Communications Security, Washington DC, October 2004.

21. M. Ramkumar, N. Memon, Preloaded Key Distribution Schemes for Ad Hoc Networks , International Conference on Computing, Communications and Control Technologies (CCCT) 2004, Austin, TX, Aug 2004.

22. M. Ramkumar and N. Memon. On the Security of Random Key Pre-Distribution Schemes. *IEEE Information Assurance Workshop*. Westpoint, NY, June 2004.

23. M. Kharrazi, K. Shanmugasundaram and N. Memon. Network Abuse Detection via Flow Content Characterization. *IEEE Information Assurance Workshop*. Westpoint, NY, June 2004.

24. M. Jiang, X. Wu, E. Wong and N. Memon. Steganalysis of Boundary-based Steganography using Autoregressive Model of Digital Boundaries. *IEEE Conference on Multimedia and Expo*, Taiwan, 2004. M. Ramkumar, N. Memon, Multiple Authorship Protocol For Watermarking, 38th Annual Conference on Information Sciences and Systems (CISS), Princeton, NJ, March 2004.

25. M. Ramkumar, N. Memon, R. Simha. Pre-Loaded Key Based Multicast and Broadcast Authentication in Mobile Ad-Hoc Networks, *Proceedings of Globecom 2003*, San Francisco, CA, December 2003.

26. K. Shanmugasundaram and N. Memon. Automatic Reassembly of Document Fragments via Context Based Statistical Models, *19th Annual Computer Security Applications Conference*, Las Vegas, Nevada, December 8-12, 2003.

27. M. Sosonkin, G. Naumovich and N. Memon. Obfuscation of Design Intent in Object-Oriented Applications, *Digital Rights Management Workshop*, Washington DC, October 2003.

28. R. Chandramouli, M. Kharrazi and N. Memon. Image Based Steganography: Concepts and Practice, *Proceedings of International Workshop on Digital Watermarking*, Springer Verlag LNCS, Seoul, October 2003.

29. K. Shanmugasundaram, N. Memon, A. Savant and H. Broinnimann. ForNet: A Distributed Forensics System, *Proceedings of Mathematical Models and Architectures for Computer and Network Security*, Springer Verlag LNCS, St. Petersburg, Russia, September 2003.

30. V. Ananthapadmanabhan, P. Frankl, N. Memon and G. Naumovich. Design of a Laboratory for Information Security Education, *Proceedings of World Conference on Information Security Education*, pp 61-73, Monterey, CA, July 2003.

31. A. Pal, K. Shanmugasundaram and N. Memon. Reassembing Image Fragments, *Proceedings ICASSP*, Honk Kong, April 2003.

32. D. Chen, Y-J Chiang, N. Memon and X. Wu. Optimal Alphabet Partitioning for Semi-Adaptive Coding of Sources of Unknown Sparse Distributions. *Proceedings of the Data Compression Conference*, pp 372-381, IEEE Press, Utah, March 2003.

33. L. Butterman and N. Memon. An Error-Resilient Blocksorting Compression Algorithm. *Proceedings of the Data Compression Conference*, pp 417, Utah, March 2003.

34. R. Chandramouli, N. Memon. Steganographic Capacity from an Active Steganalysis Perspective. *Security and Watermarking of Multimedia Contents*, Santa Clara, CA, January 2003.

35. R. Radhakrishnan, X. Zhang and N. Memon. On The Security of the Visual Hash Function. *Security and Watermarking of Multimedia Contents*, Santa Clara, CA, January 2003.

36. R. Radhakrishnan, K. Shanmugasundaram and N. Memon. Data Masking: A Secure-Covert Channel Paradigm. *IEEE Workshop on Multimedia*, St. Thomas, France, October 2002.

37. Z. Ouyang, N. Memon, T. Suel. Cluster Based Delta Compression of a Collection of Files. *WISE 02*, Singapore, November 2002.

38. I. Avcibas, N. Memon, B. Sankur. Image Steganalysis with Binary Similarity Measures. *IEEE International Conference on Image Processing*, Rochester, New York, September 2002.

39. S. Dumitrescu, X. Wu, N. Memon. On Steganalysis of Random LSB Embedding in Continuous-tone Images. *IEEE International Conference on Image Processing*, Rochester, New York, September 2002.

40. K. Shanmugasundaram and N. Memon. Automatic Reassembly of Document Fragments via Data Compression. *Digital Forensics Research Workshop*, Syracuse, NY, August 2002.

41. R. Chandramouli, G. Li and N. Memon. Adaptive Steganography *Security and Watermarking of Multimedia Contents*, San Jose, CA, February 2002.

42. R. Radhakrishnan and N. Memon. Audio Content Authentication Based on Psycho-Acoustic Model. *Security and Watermarking of Multimedia Contents*, San Jose, CA, February 2002.

43. D. Mukherjee, N. Memon, A. Said. JPEG-matched MRC compression of compound documents. *IEEE International Conference on Image Processing*, Thessaloniki, Greece, October 2001.

44. C. Chandramouli and N. Memon. Analysis of LSB-based Image Steganography techniques. *IEEE International Conference on Image Processing*, Thessaloniki, Greece, October 2001.

45. R. Regunathan and N. Memon. On the Security of the SARI Image Authentication System. *IEEE International Conference on Image Processing*, Thessaloniki, Greece, October 2001.

46. I. Avcibas, N. Memon and B. Sankur. Steganalysis based on Image Quality Metrics - Differentiating between techniques. *IEEE Workshop on Multimedia*, Cannes, France, October 2001.

47. M. Chen, E. Wong, N. Memon and S. Adams. Recent Developments in Document Image Watermarking and Data Hiding. *Multimedia Systems and Applications, SPIE Opticomm*, Denver, August 2001.

48. I. Avcibas, N. Memon and B. Sankur. Steganalysis using Image Quality Metrics. *Security and Watermarking of Multimedia Contents*, San Jose, CA, February 2001.

49. Q. Mei, E. Wong and N. Memon. Data Hiding in Binary Text Documents. *Security and Watermarking of Multimedia Contents*, San Jose, CA, February 2001.

50. I. Avcibas, N. Memon, B. Sankur and K. Sayood. Lossless Image Compression Based on Successive Refinement. *Visual Communications and Image Processing*, San Jose, CA, February 2001.

51. R. Chandramouli and N. Memon. A Distributed Detection Framework for Steganalysis. *ACM Workshop on Multimedia Security*, pp 123-126, Los Angeles, CA, November 2000.

52. N. Memon, D. Neuhoff and S. Shende. Optimizing Prediction Gain in Symmetric Axial Scans. *IEEE International Conference on Image Processing*, Vancouver, Canada, September 2000.

53. Z. Ouyang, N. Memon and T. Suel. Using Delta Encoding for Compressing Related Web Pages. Submitted to the *Data Compression Conference* '01, November 2000.

54. L. Butterman and N. Memon. Error Resilient Block Sorting. Submitted to the *Data Compression Conference* '01, November 2000.

55. R. Chandramouli and N. Memon. How many pixels to Watermark? Special Session of Multimedia Content Protection, IEEE International Conference on Information Technology: Coding and Computing, Las Vegas, NV, March 2000.

56. N. Memon and D. Tretter. A Method for Variable Quantization in JPEG for Improved Perceptual Quality. *Visual Communications and Image Processing*, San Jose CA, February 2000.

57. P. Wong and N. Memon. Secret and Public Key Authentication Watermarking Schemes that Resist Vector Quantization Attack. Proc. SPIE Vol 3971, p. 428 - 437, *Security and Watermarking of Multimedia Contents II*, San Jose, CA, February 2000.

58. J. Fridrich, M. Goljan, and N. Memon. Further Attacks on Yeung-Mintzer Fragile Watermarking Scheme. *Security and Watermarking of Multimedia Contents*, San Jose, CA, February 2000.

59. N. Memon, P. Vora, B-L Yeo and M. Yeung. Distortion Bounded Authentication Techniques. *Security and Watermarking of Multimedia Contents*, San Jose, CA, February 2000.

60. I. Avcibas, B. Sankur, K. Sayood, N. Memon. Component Ratio Preserving Compression for Remote Sensing Applications. *Visual Communications and Image Processing*, San Jose, CA, February 2000.

61. K. Gopalakrishnan, N. Memon and P. Vora. Protocols for Watermark Verification. Workshop on Multimedia Security. *ACM Multimedia Conference*, Orlando, FL, October 1999.

62. M. Holliman, N. Memon and M. Yeung. On the Need for Image Dependent Keys in Watermarking. Proceedings of the *Second Workshop on Multimedia*, Newark, NJ, March 1999.

63. M. Holliman, N. Memon and M. Yeung. Watermark estimation through local pixel correlation. *Security and Watermarking of Multimedia Content*, San Jose, CA, January 1999

64. N. Memon, P. Wong and S. Shende. On the Security of the Yeung-Mintzer Fragile Watermarking Technique. *Proceedings of PICS Conference*, Savannah, GA, April 1999.

65. N. Memon and P. Wong. A Buyer-Seller Watermarking Protocol Based on Amplitude Modulation and the El-Gamal Public Key Cryptosystem. *Security and Watermarking of Multimedia Content*, San Jose, CA, January 1998.

66. N. Memon and P. Wong. A Buyer-Seller Watermarking Protocol. In *IEEE Workshop on Multimedia Signal Processing*, Los Angeles, CA, November 1998.

67. N. Memon and P. Vora. Authentication Techniques for Multimedia Content. *Multimedia Systems and Applications*, Boston, MA, October 1998.

68. N. Memon. Efficient Rice-Golomb Coding techniques for DCT Coefficients. Proceedings *IEEE International Conference on Image Processing*, Chicago, IL, September 1998.

69. N. Memon, X. Wu and B. Yeo. Entropy Coding Techniques for Lossless Image Compression with Reversible Integer Wavelet Transforms. Proceedings *IEEE International Conference on Image Processing*, Chicago, IL, September 1998.

70. N. Memon, D. Neuhoff and S. Shende. On Scanning Techniques for Lossless Compression with Limited Context-Supports. Proceedings *IEEE International Conference on Image Processing*, Chicago, IL, September 1998.

71. M. Holliman and N. Memon. Counterfeiting Attacks for Linear Watermarking Techniques. Workshop on Multimedia Security, *IEEE Multimedia Conference*, Dallas, TX, July 1998.

72. R. Ansari, E. Ceran and N. Memon. Near-lossless Image Compression. Proceedings of *Visual Communications and Image Processing*, San Jose, CA, January 1998.

73. X. Wu and N. Memon. Inter-band Lossless Image Compression. Proceedings of the *Data Compression Conference*, Snowbird, UT, March 1998.

74. M. Holliman, N. Memon, M. Yeung and B-L. Yeo. Fast and Adaptive Public Watermarking Technique. *Multimedia Databases*, San Jose, CA, January 1998 .

75. N. Memon, D. Neuhoff and S. Shende. An Analysis of Some Common Scanning Techniques For Lossless Image Coding. Proceedings of 31'st *Asilomar Conference*, Monterey, CA, November 1997.

76. J. Cinkler, X. Kong and N. Memon. Lossless and Near-lossless Compression of EEG Signals. Proceedings of 31'st *Asilomar Conference*, Monterey, CA, November 1997.

77. X. Kong, T. Qui, N. Memon and M. Tahernazadi. Evoked Potential Compression using AOTLC and DPCM. Proceedings of *Engineering in Medicine and Biology Conference*, Chicago, IL, November 1997.

78. N. Memon and N. Moayeri. A New Distortion Criteria for Near-Lossless Image Compression. Proceedings of *International Conference on Image Processing*, Santa Barbara, CA, October 1997.

79. S. Craver, N. Memon, B. Yeo and M. Yeung. On the Invertibility of Invisible Watermarking Techniques. Proceedings of *IEEE International Conference on Image Processing*, Santa Barbara, CA, October 1997.

80. D. Benham, N. Memon, B. Yeo and M. Yeung. Fast Watermarking of Compressed Images in DCT Domain. Proceedings of *International Conference on Imaging Science, Systems, and Applications* (CISST'97), Las Vegas, NV, July 1997,

81. N. Memon and R. Rodila. Optimal conversion of GIF images to JPEG-LS. Proceedings of *IEEE International Conference on Consumer Electronics*, Chicago IL, January 1997.

82. S. Craver, N. Memon, B. Yeo and M. Yeung. Can Invisible Watermarks Resolve Rightful Ownership? *Multimedia Security*, San Jose, CA, February 1997. Also appears as IBM Technical Report RC 20509 (90894), IBM Cyber Journal.

83. N. Memon, V. Sippy and X. Wu, An Interband Coding Extension of New Lossless JPEG Standard. Proceedings of *Visual Communications and Image Processing*, San Jose, CA, January 1997.

84. N. Memon, M. Tahernazadi and V. Yellapantula Lossless Compression of Images Using Subband Decomposition. Proceedings of the *IEEE International Conference on Consumer Electronics*, Chicago, IL, June 1996.

85. X. Wu, N. Memon, G. Langdon. The JPEG Lossless Image Compression Project and Convergence to High Compressibility. Proceedings of the *NASA/Industry Workshop on Data Compression*, pages 71-80, JPL Publication 96-11, Snowbird, UT, April 1996.

86. N. Memon, V. Sippy and X. Wu. A Comparison of the Prediction Schemes Proposed for a New Standard on Lossless Coding of Continuous-tone Still Images. Proceedings of *International Symposium on Circuits and Systems* Volume 2, pages 309-312, Atlanta, GA, May 1996.

87. N. Memon. A Bounded Distortion Coding Technique for Hyper-Spectral Image Data. Proceedings of *IEEE International Symposium on Geosciences and Remote Sensing 96*, Lincoln, NE, May 1996.

88. A. Harris and N. Memon. A Very Low Bit-rate Video Codec Using Binary Segmentation Trees. Proceedings of *International Telecommunication Conference*, Istanbul, Turkey, 1996.

89. X. Wu and N. Memon. CALIC - A Context-based, Adaptive, Lossless Image Coding Scheme. Proceedings of *International Conference on Acoustics, Speech and Signal Processing*, Volume IV, pages 1891-1894, Atlanta, GA, May 1996.

90. N. Memon. A Vector Excitation Coding Technique for Image Data. *Still Image Compression.* SPIE Proceedings, pages 131-140, San Jose, CA, January 1996.

91. N. Memon and V. Ayalur. Re-ordering Palettes for Archiving Color-mapped Images. *Digital Image Storage and Archival Systems.* SPIE Proceedings Volume 2606, pages 221-231, Boston, MA, October 1995.

92. N. Memon and K. Sayood. Asymmetric Lossless Image Compression. Proceedings of the *Second IEEE International Conference on Image Processing.* IEEE Press, Volume III, pages 97-100, Washington DC, September 1995.

93. N. Memon and N. Galatsanos. A Spatially Adaptive Spectral Re-ordering Technique for Lossless Coding of Hyper-spectral Images. *1995 Science Information Management and Data Compression Workshop*, NASA Conference Publication 3315, pages 1-11, Greenbelt, MD, March 1995.

94. N. Memon and K. Sayood. Lossless Image Compression - a Comparative Study. *Still Image Compression*, pages 8–20. SPIE Proceedings Volume 2418, San Jose, January 1995.

95. N. Memon and K. Sayood. Asymmetric Lossless Image Compression. Proceedings of the *Data Compression Conference*, page 457. IEEE Press, Snowbird, UT, March 1995.

96. N. Memon and K. Sayood. Reversible Compression of a Video Sequence. *Visual Communications and Image Processing*, pages 1648–1661. SPIE Proceedings Volume 2308, Chicago, IL, October 1994.

97. N. Memon, S. Ray, and K. Sayood. Differential Lossless Encoding of Images using Non-linear Prediction Techniques. *Proceedings of the First IEEE International Conference on Image Processing*, pages 841–845, IEEE Press, Austin, TX, 1994.

98. N. Memon and K. Sayood. A Taxonomy for Lossless Image Compression. *Proceedings of the IEEE Data Compression Conference*, page 526. IEEE Press, Snowbird, UT, March 1994.

99. N. Memon and K. Sayood. Lossless Compression of Color Images in the RGB Domain. In *Applications of Digital Image processing XVII*, pages 95–106. SPIE Proceedings Volume 2298, San Diego, CA, July 1994.

100. N. Memon. Scan Predictive Vector Quantization of Multi-spectral Images. *Proceedings of the International Geosciences and Remote Sensing Symposium.* IEEE Press, San Diego, CA, March 1994.

101. N. Memon and M. Mareboyana. Vector Quantization Techniques using Predictive Ordering and Linear Approximation. *Proceedings of the International Picture Coding Symposium*, pages 166–169, Davis, CA, August 1994.

102. N. Memon and S. Ray. Ordering Color Maps for Lossless Compression. *Visual Communications and Image Processing*, pages 1192–1203. SPIE Proceedings Volume 2308, 1994.

103. N. Memon, K. Sayood, and S. S. Magliveras. Efficient Scan Patterns for Image Decorrelation. Proceedings of the *Thirty First Annual Allerton Conference on Communications Control and Computing*, pages 463–472, Allerton, IL, September 1993.

104. N. Memon, K. Sayood, and S. S. Magliveras. New Techniques for Reversible Compression of Multi-spectral Image Data. Proceedings of the *Computing in Aerospace 9 Conference*, pages 148–156, San Diego, CA, March 1993.

105. N. Memon, K. Sayood, and S. S. Magliveras. Lossless Image Compression Using a Codebook of Prediction Trees. Proceedings of the *Data Compression Conference*, pages 181–190, Snowbird, UT, 1992.

106. N. Memon, K. Sayood, and S. S. Magliveras. Lossless Image Compression with Efficient Scan Patterns. Proceedings of the *Twenty Sixth Annual Conference on Information Sciences and Systems*, page 256, Princeton, NJ, March 1992.

107. N. Memon, S. S. Magliveras, and K. Sayood. Prediction Trees and Lossless Image Compression. Proceedings of the *Data Compression Conference*, pages 83–92. Snowbird, UT, March 1991.

108. S. S. Magliveras and N. Memon. Random Permutations from Logarithmic Signatures. *Computing in the 90's*, volume 507 of *Lecture Notes in Computer Science*, pages 91–97. Springer-Verlag, Kalamazoo, MI, October 1989.

109. S. S. Magliveras and N. Memon. Properties of Cryptosystem PGM. *Advances in Cryptology - CRYPTO 89*, volume 435 of *Lecture Notes in Computer Science*, pages 447–460. Springer-Verlag, Santa Barbara, CA, August 1989.

Publications in Review

1. M. Ramkumar, N. Memon, R. Simha. A Hierarchical Key Pre-distribution scheme, submitted to *EIT 2005.*

2. D. Chen, Y-J Chiang, N. Memon and X. Wu. Lossless Geometry Compression for Steady-State and Time-Varying Irregular Grids. *Submitted to IEEE Transactions on Visualization*, March 2005.

3. D. Chen, X. Wu, Y-J Chiang, and N. Memon. Multiple-Description Geometry Compression for Networked Interactive 3D Graphics. *Submitted to IEEE Transactions on Visualization*, March 2005.

4. D. Trendifilov, T. Suel and N. Memon. ZDelta - A Delta Compression Technique and Some Applications, *Submitted to IEEE Transactions on Computers*, January 2004.

5. H. Ozer, N. Memon and B. Sankur. Detection of Audio Covert Channels Using Statistical Footprints of Hidden Message. *Submitted to IEEE Transactions on Speech and Audio Processing, Under Revision*, July 2003.

Book Reviews

1. Information Hiding. *Journal of Electronic Imaging*, August 2001.

2. A Compendium of Standards, *IEEE Spectrum*, March 1998.

3. Digital Compression Exegesis, Straight From the Apostles, *IEEE Spectrum*, September 1997.

Other Publications

1. M. Ramkumar, N. Memon, Security of Random Key Pre-distribution Schemes With Limited Tamper Resistance, Cryptology ePrint Archive, April 2004.
2. M. Ramkumar, N. Memon, HARPS: HAshed Random Preloaded Subset Key Distribution, Cryptology ePrint Archive, August 2003.
3. C. Chrysafis, A. Drukarev, S. Liu, and N. Memon. Some results on DCT based JPEG experiments, *International Standards Organization Working Document*, ISO/IEC JTC/SC29/WG1N748, Geneva, March 1998.
4. N. Memon and X. Wu. A Simple Inter-band Coding Extension of Baseline JPEG-LS. *International Standards Organization Working Document*, ISO/IEC/SC29/WG 1/N451, Garmisch, Germany, June 1997.
5. X. Wu and N. Memon. Suggestions for Near-lossless Compression. *International Standards Organization Working document*, ISO/IEC/SC29/WG 1/N467, Garmisch, Germany, June 1997.
6. X. Wu and N. Memon. Comments and Suggestions on Further Compression Gains. *International Standards Organization Working Document*, ISO/IEC/SC29/WG 1/N395, Palo Alto, CA, March 1997.
7. X. Wu and N. Memon. A Comparison of CALIC and LOCO. *International Standards Organization Working document*, ISO/IEC/SC29/WG 1/N274, Dallas, TX, November 1996.
8. X. Wu, N. Memon and K. Sayood. A Context-based, Adaptive, Lossless/Nearly-Lossless Coding Scheme for Continuous-tone Images. *International Standards Organization Working document*, ISO/IEC SC29/WG 1/N256, Epernay, France, June 1996.
9. Proceedings of *International Conference on Imaging Science, Systems, and Applications* July, 1997, Associate Editor.

Funded Grants

1. N. Memon (PI) Information Assurance Capacity Building $125,000. NSA/DoD. Sept 05 - 06.
2. N. Memon (PI), Source Camera Identification. National Institute of Justice. $350,000, Sep 05 - 07.
3. N. Memon (PI), Image Forensics. *AFOSR*, $260,000, Feb 2005- Jan 2007.
4. N. Memon (PI), H. Bronnimann, J. Wein, D. Salane and A. Schwartz ForNet: A Distributed Network Forensics System. *NSF*, $750,000. September 2004 - 2007.
5. R. Chandramouli (PI) and N. Memon (Co-PI). Fundamental and Practical Issues in Stochastic Filter Design for Image Steganalysis. *Air Force Research Labs, Rome, NY.* $161,500, June 2004 - 2005.
6. R. Simha (PI), A. Chowdhary (Co-PI), N. Memon (Co-PI) and B. Narahari (Co-PI). ITR: A Hardware/Compiler Co-Design Approach to Software Protection, *NSF*, $1,000,000, September 2003 - 2006.

7. N. Memon (PI), G. Naumovich (Co-PI), P, Frankl (Co-PI), R. Karri (Co-PI). Information Systems and Internet Security Laboratory, *Cisco Systems*, $90,000, September 2003.

8. N. Memon (PI). Audio Steganalysis Techniques, *Air Force Research Laboratories*, $260,000, September 2003 - 2005.

9. J. C. Birget (PI), D. Hong (Co-PI), N. Memon (Co-PI), S. Weidenbeck (Co-PI), Graphical passwords: design, analysis and human factors, *NSF*, $400,00, September 2003 - 2005.

10. N. Memon (PI). ForNet: A Distributed Network Forensics System. *DoD/NSA*, $98,000. September 2003 - 2004.

11. N. Memon (PI) G. Naumovich (Co-PI), P, Frankl (Co-PI). Information Assurance Scholarships. *NSA/DoD*, $128,000, September 2003 - 2004.

12. N. Memon (PI), E. Wong (Co-PI), X. Wu (Co-PI). Steganalysis Techniques for Documents and Images. *Air Force Office of Scientific Research.* $207,000. December 2002 - 2004.

13. N. Memon (PI), G. Naumovich (Co-PI), P, Frankl (Co-PI). Information Assurance Scholarships. *NSA/DoD.* $125,067. September 2002 - 2003.

14. N. Memon (PI), R. Karri (Co-PI). HINDER - Hardware Based Intrusion Detector. *NSA/DoD.* September 2002 - 2003.

15. G. Naumovich (PI), P. Frankl (Co-PI), N. Memon (Co-PI). Computing with Untrusted Code. *NSA/DoD.* September 2002 - 2003.

16. N. Memon (PI). US-Turkey Collaboration: Steganalysis Techniques For Images And Audio. *NSF.* $30,000. July 2002 - 2005.

17. X. Wu (PI) and N. Memon (Co-PI). An Algorithmic Study of Optimal Multi-resolution Quantization and Joint Source-Channel Coding. *NSF.* $300,000. June 2002 - 2005.

18. R. Chandramouli (PI) and N. Memon (Co-PI). A Mathematical Theory for Steganalysis. *Air Force Research Labs, Rome, NY.* $199,500, June 2002 - 2004.

19. N. Memon (PI), G. Naumovich (Co-PI), P. Frankl (Co-PI). Scholarship for service in information assurance. *NSF.* $3,950,000. June 2002 - 2006.

20. N. Memon (PI), G. Naumovich (Co-PI), P. Frankl (Co-PI). Capacity Building Project in Information Assurance Education. *NSF.* $198,162, June 2002 - 2004.

21. N. Memon (PI). Video Delivery Over Wireless Channels. *Mitsubishi Research.* $60,000. May 2002 - 2005.

22. Y. Chiang (PI) and N. Memon (Co-PI). Integrated Compression and Out-of-Core Techniques for Large Time-Varying Data Visualization. *NSF.* $400,000, September 2001 - 2004.

23. N. Memon (PI) and T.Suel (Co-PI). An Optimized Proxy-Based Architecture for Wireless Web Access" *Intel Corporation.* $70,000, April 2001 - April 2002.

24. N. Memon (PI) Steganalysis of Digital Watermarking Techniques. *Air Force Office of Scientific Research.* $190,000 March 2001 - 2003.

25. N. Memon (PI) and Y. Wang (Co-PI). Video Summarization. *Mitsubishi Research.* $90,000. Jan 2001 - 2003.

26. N. Memon (PI) and T.Suel (Co-PI). Optimized Content Delivery Over Wireless Channels, *Intel, Microcomputer Research Lab*, $74,600, July 2000.

27. N. Memon (PI) and G. Naumovich (Co-PI), Software Watermarking, *Panasonic Information Technology Lab*, $96,000, May 2000 - March 2002.

28. S. Chandramouli (PI)and N. Memon (Co-PI). Error Resilient Video Compression, *Sun Microsystems Equipment Grant*, $35,000, March 2000.

29. N. Memon (PI). Differential Transmission of Web Content over Wireless Channels, *Intel Research Equipment Grant*, $20,000, December 1999.

30. N. Memon (PI) and P. Frankl (Co-PI). An Undergraduate Laboratory in Computer Systems Security, *National Science Foundation*, $160,000, December 1999.

31. N. Memon (PI). Compound Image Compression, *Hewlett Packard Research Labs*, $20,000, June 1999.

32. N. Memon (PI). US-Turkey Collaborative Research on Subband Decomposition Based Lossless Image Compression Techniques, *National Science Foundation*, $30,000, July 1997.

33. N. Memon (PI). Lossless, Near-Lossless and Lossy Plus Lossless Image Compression, *National Science Foundation CAREER Award*, $205,000, May 1997.

34. N. Memon (PI). Development of a New International Standard on Lossless Image Compression, Graduate Council Committee on Research and Artistry, *Northern Illinois University*, $5,500, June 1996.

35. N. Memon (PI). Planning Visit for U.S.-Turkey Cooperative Research on Sub-Band Decomposition-Based Lossless Image Compression Techniques, *National Science Foundation*, $1,900, March 1996.

36. N. Memon (PI). Permutation Source Codes for Lossless Image Compression, *University of Nebraska* $5,000, October 1995.

37. N. Memon (PI). Compression Schemes for Multi-spectral Image Data - Graduate Council Committee on Research and Artistry, *Northern Illinois University*, $4,500, June 1995.

38. N. Memon (PI). Compression of Multi-spectral Image Data, Research Initiation Award, *Arkansas Science and Technology Authority*, $29,000 January 1994.

39. A. Talmadge (PI), A. Sustich (Co-PI) and N. Memon (Co-PI), A Establishment of a Multimedia Learning Environment, *Arkansas Dept. of Higher Education*, $80,000, April 1994.

40. N. Memon (PI). Establishment of a Research Group in Data Compression, *Arkansas Space Grant Consortium*, $8,151, October 1993.

41. N. Memon (PI). Lossless Compression of Multispectral Image Data, Faculty Research Council, *Arkansas State University*, $7,457, June 1993.

42. N. Memon (PI). Compression of Space Data, *Arkansas Space Grant Consortium*, $1,960, February 1993.

Professional Service

Editorships

1. Associate Editor. *IEEE Signal Processing.* Jan 06 - present.
2. Associate Editor. *IEEE Security and Privacy.* Jan 06 - present.
3. Associate Editor. *IEEE Transactions on Information Forensics and Security.* Jan 2005 - Current.
4. Associate Editor - *LNCS Transactions on Multimedia Security*, Sept 05 - current.
5. Associate Editor, *International Journal of Security and Networks.* July 05 - Current.
6. Editorial Board, *The Advances in Cryptology & Information Security (ACIS) series.* IOS Press. July 05 - Current.
7. Associate Editor, *Journal of Electronic Imaging.* Jan 2003 - Dec 05.
8. Associate Editor. *ACM Multimedia Systems Journal.* September 2001 - 2004.
9. Associate Editor. *IEEE Transaction on Image Processing.* March 1999 - 2002.
10. Guest Editor. Special Issue on Multimedia Security and Rights Management. *EURASIP Journal on Applied Signal Processing.* Expected Publication March 2004.
11. Guest Editor. Special Issue on Security of Data Hiding Technologies. *Signal Processing Journal.* Expected Publication August 2003.
12. Guest Editor. Special Issue on Multimedia Security *ACM Multimedia Systems Journal*, June 2003.
13. Guest Editor. Special Issue on Signal Processing for Data Hiding in Digital Media & Secure Content Delivery. *IEEE Transactions on Signal Processing.* April 2003.
14. Project Co-editor - *JPEG-LS Extensions*, Lossless Compression Standards Project, JPEG/JBIG, International Standards Organization, November 1997 - 1999.

Technical Committees

1. Technical Committee on Multimedia Signal Processing. *IEEE Signal Processing Society.* 2005 - Current.
2. Technical Committee on Information Security and Forensics. *IEEE Signal Processing Society.* 2005 - Current.

Standard's Committees

1. Ad-Hoc Committee Member, *JPEG-LS*, Lossless Compression Standards Project, JPEG/JBIG, International Standards Organization, June 1996 - 1999.
2. Chair - Ad-hoc group on convergence. Lossless Compression Standard Project, International Standards Organization JPEG/JBIG committee meeting, Garmisch, Germany, June 1996 and Palo Alto, California, November 1996.

Organizing Committee

1. Local Arrangements and Finance Chair. *ACM Multimedia Security Workshop.*, August 2005.
2. Special Session Organizer. *Image Forensics*, International Conference in Image Processing, Singapore, September 2004.
3. Organizing Committee, NY State Cyber conference, Hudson Valley, NY, November 2003.
4. Track Chair. *Information Networking*, ITRE 2003, Newark, NJ, July 2003.
5. Track Chair. *Watermarking and Security*, ICME 2003, Baltimore, June 2003.
6. Special Session Organizer - *Watermarking Protocols*, Security and Watermarking of Multimedia Contents IV, San Jose, CA, February 2002 and 2003.
7. Special Session Organizer - *Digital Watermarking*, Multimedia Systems and Applications IV, ITCOM, Denver, August 2001.
8. Digital Media Co-Chair, *IEEE Conference on Multimedia and Expo*, New York, NY, July 2000.
9. Session Organizer - *Multimedia Content Protection*, IEEE International Conference on Information Technology: Coding and Computing, Las Vegas, NV, March 2000.
10. Session Organizer - *Image Security*, Multimedia Systems and Applications, Boston, MA, September 1999.
11. Session Organizer - *Still Image Compression*, 32'nd Asilomar Conference, Monterey, CA, November 1998.
12. Session Organizer - *Data Compression and Signal Processing Applications*, 31'st Asilomar Conference, Monterey, CA, November 1997.
13. Session Organizer - *Data Compression in Remote Sensing* International Geosciences and Remote Sensing Symposium, Lincoln, NE, May 1996.

Session Chair

1. *Image Froensics*, International Conference in Image Processing, Singapore, September 2004.
2. *Steganography and Steganalysis*, Security and Watermarking of Multimedia Contents, San Jose, CA, February 2002.
3. *Networking Protocols*, ITRE 2003, Newark, NJ, July 2003.
4. *Oral Session on Watermarking*, ICME 2003, Baltimore, June 2003.
5. *Authentication Protocols*, Security and Watermarking of Multimedia Contents V, San Jose, CA, February 2003.
6. *Watermarking Protocols*, Security and Watermarking of Multimedia Contents IV, San Jose, CA, February 2002.

7. *Communications Approach to Watermarking* Security and Watermarking of Multimedia Contents, San Jose, CA, February 2001.

8. *Lossless Image Compression*, IEEE International Conference on Image Processing, Vancouver, Canada, September 2000.

9. *Web Search/Retreival and Applications*, IEEE Conference on Multimedia and Expo, New York, NY, July 2000.

10. *Multimedia Content Protection*, IEEE International Conference on Information Technology: Coding and Computing, Las Vegas, NV, March 2000.

11. *Still Image Coding*, Visual Communications and Image Processing, San Jose, CA, February 2000.

12. *Image Watermarking*, Security and Watermarking of Multimedia Content, San Jose, CA, February 2000.

13. *Image Security*, Multimedia Systems and Applications, Boston, MA, September 1999.

14. *Watermarking of Text, Graphics, and Halftones*, Security and Watermarking of Multimedia Contents, San Jose, CA, February 1999.

15. *Lossless Image Compression*, IEEE International Conference on Image Processing, Chicago, IL, October 1998.

16. *Still Image Compression*, 32'nd Asilomar Conference, Monterey, CA, November 1998.

17. *Data Compression and Signal Processing Applications*, 31'st Asilomar Conference, Monterey, CA, November 1997.

18. *Multimedia Security*, International Conference on Imaging Science and Technology, Las Vegas, NV, June 1997.

19. *Data Compression in Remote Sensing*, IEEE International Geosciences and Remote Sensing Symposium, Lincoln, NE, May 1996.

20. *Data Compression in Remote Sensing*, IEEE International Geosciences and Remote Sensing Symposium, San Diego, CA, July 1994.

Program Committee

1. *International*

2. IEEE International Conference on Image Processing, *1999 - 2005.*

3. International Workshop on Digital Watermarking, *2003 - 2005.*

4. Multimedia Systems and Applications, *Boston, 2000 - 2004.*

5. IEEE Conference on Multimedia and Expo, *2000 - 2005.*

6. Security and Watermarking of Multimedia Contents, *San Jose, CA, 1999 - 2006.*

7. IEEE International Conference on Information Technology: Coding and Computing, *Las Vegas, NV, 2000 and 2001.*

8. Communications and Multimedia Security, *Darmstadt, Germany, May 2001.*

9. International Conference on Imaging Science and Technology, *Las Vegas, NV, June 1997.*

10. International Geosciences and Remote Sensing Symposium, *Lincoln, NE, 1996.*

Invited Panels, Tutorials and Keynote Talks

1. Digital Watermarking and Steganography. Invited Tutorial. SPCOM 2005, Indian Institute of Science, Bangalore. December 2004.

2. Information Hiding - Theory and Application. Invited Tutorial. Institute of Mathematical Sciences, National University of Singapore, December 2003.

3. The Future of Steganography. Invited Panel Member. NY State Cyber Security Conference, Hudson Valley, November 2003.

4. Image Steganography - Theory and Practice. Invited Keynote Speech, International Workshop on Digital Watermarking, Seoul, Korea, October 2003.

5. Fornet: A Distributed Network Forensics System. Invited Keynote Speech. Mathematical Models and Architectures for Computer and Network Security, St. Petersburg, Russia, October 2003.

6. Invited Panel Member. Signal Processing Magazine Forum on Information Hiding, 2003.

7. The Future of Digital Watermarking. Invited Panel Member. Multimedia Signal Processing Workshop, Virgin Islands, November 2002.

8. Digital Watermarks - Invited Panel Discussion, *Workshop on Multimedia Security, IEEE Multimedia Conference*, Austin, TX, July 1998.

9. Report on New International Standard for Lossless Image Compression. Invited Panel Discussion, *IEEE Data Compression Conference*, Snowbird, UT, March 1996.

Affiliations

Member - ACM, IEEE, SPIE,, IEEE Signal Processing Group.

Appendix B
Memon 2

RECEIVED
CENTRAL FAX CENTER
JUL 17 2007

Attorney Docket No.: 3247/NJJ (058201-00050)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor:	SCOTT P. SCHREER
Confirmation No.	3357
Serial No.:	10/086,089
Filed:	February 28, 2002
Title:	IMPROVED SYSTEM AND METHOD FOR ACCESSING....
Examiner:	Jason P. Salce
Group Art Unit:	2623

July 17, 2007

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22314-1450

SUPPLEMENTAL DECLARATION UNDER RULE 1.132

I, Nasir Memon hereby declare as follows:

1. I am the same individual that has given a previous declaration under Rule 1.132 in this prosecution, dated October 12, 2006. My credentials, background, technical capability, and a copy of my CV was submitted therein.

2. I provide this additional declaration in response to the examiner's office action dated February 20, 2007. I have studied the examiner's office action, specifically the Response to Arguments, where he comments upon my previous declaration, and have also reviewed the

additional sections referred to by the examiner in the Ginter reference, as well as the additional claim rejections he has provided in this official action.

3. The examiner has indicated that the claim is broad in that there is no claim limitation that teaches where exactly in the network the monitoring is taking place. I do not believe that the specific location where the monitoring station resides is significant with respect to the invention. The significance of the invention is that the monitoring is done by receiving the broadcast after it has been broadcast. The specific physical location of the monitoring station is not significant. The significance is that the monitoring is done after it is broadcast. That means monitoring can be anywhere where the broadcast its received.

4. Additionally, the present application consistently refers to a monitoring station indicating the presence of a single monitoring station and not a plurality of them. Accordingly, these two facts are understood by one skilled in the art to envision a single monitoring station, located anywhere in the broadcast domain which receives the broadcast as it is being transmitted to the audience.

5. As I previously indicated, a clear distinction between the prior art referred to by the examiner and the present invention is that in the present invention, once the information is broadcast, even if no user has his receiver on and no one actually receives the particular music or information broadcast, there is still a monitoring and receiving of the fact that the music or other information has been broadcast, based upon the fact that the sender has broadcast the information. Thus, even if no one is actually receiving and using it, it will still be counted as a broadcast.

In the prior art, especially Ginter, if there is no specific user who has requested the information and is actually receiving it, there will be absolutely no recording of the information.

6. In support of his argument, the examiner has referred to the Ginter prior art reference again. He specifically refer to col. 3, lines 24-33 as allegedly teaching that the VDE system provides a system to monitor and detect the use of commercial information using various types of distribution methods, including digital broadcast.

I have carefully reviewed col. 3, lines 24-33 and they do not mention monitoring and broadcast. In fact, the subsequent teachings all involve monitoring at each and every recipient of the broadcast, contrary to the examiner's assertion.

7. The examiner has further referred to col. 147, lines 34-64 in connection with Fig. 25 C, which the examiner alleges teaches multiple intermediate points in the network that monitor the usage of each object.

Again I have carefully reviewed this section. As far as I can detect, this section describes a data structure for keeping track of usage of a specific content. It does not appear to have anything to do with the location where the usage is being monitored, as the examiner suggests.

8. I have reviewed the claims as they have been currently amended and are included within the accompanying amendment. I believe that these amendments clearly bring out distinctions between the present amendment and the references cited by the examiner. They again point out that the monitoring station receives the broadcast which is sent out to the public. Whether the public receives it or not, so long as the monitoring station receives the broadcast, it

already records the data regardless of whether there is a specific subscriber requesting the information or a specific user who has subscribed or requested the information.

9. Furthermore, I believe that as one skilled in the art, all of the language of the claim is adequately supported by the specification. Particularly, I have found support on the last two lines of page 7 indicating that the information is "solely" from the broadcast; page 8, line 16 which points out that currently there is no way to detect when the performances are getting broadcast; page 9, line 5, pointing out that the monitoring is just of the broadcast itself; page 12, lines 9-10 indicating that the monitoring station receives the broadcast; page 12, lines 19-20 indicating that the encoding is received by the monitoring means; and page 14, line 3, pointing out that the ID number from the monitoring station is then utilized to identify the title.

10. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

7/11/07
Date

Nasir Memon

Appendix C

Copy of Pitman Provisional Application

11-06-00

A/Prov

PROVISIONAL APPLICATION COVER SHEET

This is a request for filing a **PROVISIONAL APPLICATION** under 37 CFR 1.53(b)(2).

DOCKET NUMBER	YOR920000784	Type a plus (+) inside this box	+

INVENTOR(s)/APPLICANT(s)

LAST NAME	FIRST NAME	MIDDLE INITIAL	RESIDENCE (City and either State or Foreign Country)
Abrams	Steven	-	New City, New York 10956
Fitch	Blake	G.	White Plains, New York 10605
Germain	Robert	S.	Tuckahoe, New York 10707
Pitman	Michael	C.	Newburgh, New York 12550

TITLE OF THE INVENTION (280 characters max)

FEATURE-BASED AUDIO IDENTIFICATION

CORRESPONDENCE ADDRESS

Casey P. August; IBM Corporation; Intellectual Property Law Dept.;
P.O. Box 218; Yorktown Heights, New York 10598

STATE	New York	ZIP CODE	10598	COUNTRY	USA

ENCLOSED APPLICATION PARTS (check all that apply)

[X] Specification — Number of Pages: 9 — [ ] Small Entity Statement

[X] Drawing(s) — Number of Sheets: 0 — [ ] Other (specify)

METHOD OF PAYMENT (check one)

[ ] A check or money order is enclosed to cover the Provisional filing fees

[X] The Commissioner is hereby authorized to charge filing fees and credit Deposit Account Number 09-0468

PROVISIONAL FILING FEE AMOUNT ($)	$150.00

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

[X] No

[ ] Yes, the name of the U.S. Government agency and the Government contract number are: _____

Respectfully submitted,

SIGNATURE _____ Date: 11/3/00

TYPED or PRINTED NAME Manny W. Schecter Registration No. 31,722

[ ] Additional inventors are being named on separately numbered sheets attached hereto.

PROVISIONAL APPLICATION FILING ONLY

EL549238275US
Date of Deposit: Nov 3, 2000

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Abrams, et al
Serial No.: To be assigned
Filed: Herewith

Group No.:
Examiner:

For: FEATURE-BASED AUDIO IDENTIFICATION

Commissioner of Patent and Trademarks
Washington, DC 20231

EXPRESS MAIL CERTIFICATE

Express Mail Label Number EL549238275US
Date of Deposit Nov. 3, 2000

I hereby certify that attached paper or fee:

PROVISIONAL PATENT APPLICATION
PROVISIONAL APPLICATION COVER SHEET (Original & one (1) copy)
RETURN ACKNOWLEDGEMENT POST CARD

is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and addressed to the Commissioner of Patents and Trademarks, Washington, DC 20231.

MARGARET M. BROWN
(Name)

Margaret M. Brown
Signature

Note: Each paper must have its own certificate and the "Express Mail" label number as a part thereof or attached thereto. When, as here, the certification is presented on a separate sheet, that sheet must (1) be signed and (2) fully identify and be securely attached to the paper or fee it accompanies. Identification should include the serial number and filing date of the application as well as the type of paper being filed, e.g. complete application, specification and drawings, responses to rejection or refusal, notice of appeal, etc. If the serial number of the application is not known, the identification should include at least the name of the inventor(s) and the title of the invention.

Note: The label number need not be placed on each page. It should, however, be placed on the first page of each separate document, such as, a new application, amendment, assignment, and transmittal letter for a fee, along with the certificate of mailing by "Express Mail". Although the label number may be on checks, such a practice is not required. In order not to deface formal drawings it is suggested that the label number be placed on the back of each formal drawing or the drawings be accompanied by a set of informal drawings on which the label number is placed.

Docket No. YOR920000784

EL549238275US
Date of Deposit: Nov 3, 2000

EL549238275US
Date of Deposit: Nov 3, 2000

YOR920000784
Abrams, et al

FEATURE-BASED AUDIO IDENTIFICATION

by: Michael C. Pitman, Blake G. Fitch, Robert S. Germain, Steven Abrams

1. Describe your invention, stating the problem solved (if appropriate), and indicating the advantages of using the invention.

This disclosure describes a method for the identification of a musical recording based on features derived solely from the content of the recording. A current problem faced by the music industry is the unauthorized distribution of copies of music encoded in mp3 or other such formats and posted to the internet. Once they are posted to the internet many users may download them without paying royalties to the legitimate holding company. This results in a substantial loss of revenue to the industry. There is currently no automated method available to identify whether a particular file available on the internet has been posted illegally. The royalty tracking companies must rely on manual identification by people to determine the identity of the music. This is time and resource consuming, and is not seen as a real solution to the problem by the industry. An automatic solution for the identification of music from a file, such as an mp3 file, is of interest to the industry.

The identification of music from a digital audio file, such as an mp3 file, is not a trivial problem. A bitwise comparison of the files fails because different encoding algorithms produce a different bit sequence. There are a number of distortions and artifacts from encoding or other sources. These effects change the bitstream, but are practically undetectable to the human ear when the music is

played. Sources include, digital-to-analog conversion, recording off the radio, and various filters that alter the frequency response or add effects such as reverb.

Digital watermarking has been the primary approach used to address this problem. Watermarking fails to provide security due to the many ways to render the watermark unrecognizable. Such failings of watermarks to withstand attacks has recently become notable and other solutions to this problem are of interest.

The solution described here is a method to extract features from the digital audio recording that can be used to identify the same piece of music in a database. The features are robust to various distortions found in the most common sources of illegally copied digital audio files. We describe how to use these features as the basis for a search system that can identify a recording from an audio stream, provided a copy of the recording is in a database of music that has been keyed with the features described herein. This signal may be in digital or analog.

2. How does the invention solve the problem or achieve an advantage,(a description of "the invention", including figures inline as appropriate)?

The invention determines whether an audio stream contains a section of music in a database. This is approached by extracting features from the stream. Briefly, the features characterize the specific form of power dissipation present in the audio stream. Each feature forms a key, and is stored with the time offset of where the feature exists in the stream. Features in an unknown or query audio stream are used to index features from a database of previously registered keys from the list of songs the system is attempting to identify. When a key from the query retrieves corresponding keys from the database, the offsets of the retrieved records are used to compute alignments that bring the two keys into register. Each alignment is scored by the number of feature correspondences the query has with the stored piece. An identification is made when more than a threshold number of keys from a stored piece yield a consistent registration onto the query, or by choosing the strongest identification that is consistent over time.

The invention has two phases: a storage phase and a retrieval phase. The storage phase creates and stores all the features from the audio samples one wishes to identify. This is done once and may be repeatedly used to identify whether any of the contents are present in any number of audio sources. The retrieval phase may be a real time or faster, continual process where features are extracted on the fly and matched against the database. The retrieval phase reports it's best match of the current region of the audio stream at periodic intervals, typically every 10-30 seconds.

In the storage phase, the keys are extracted from a collection of audio files, preferably mp3, but any format capable of generating the raw signal that could be sent to an audio output device is appropriate. Features are extracted for each audio sample as described below. The keys resulting from the feature extraction procedure are used to store the time offset of the key and a sample identifier.

From the raw audio stream, the power spectrum is estimated at a series of times. A power spectrum gives the magnitude of power dissipated at particular frequencies for the time of estimation. Typically, the power spectrum is estimated by averaging overlapping windows of the amplitudes of the audio stream according to the "Periodogram method". see "Power Spectrum Estimation using FFT" in Numerical Recipes in C, Press et. al. Cambridge University Press, 1993. Other such estimations of the power spectrum may be used. In a typical case, the power spectrum is estimated by taking the average of 4 overlapping windows of length 2048. The time interval is 1024 points. Typically, the music is downsampled to 22050Hz. This means that each time unit represents about 1/21.5th of a second, and represents the power dissipated in the next 8/21.5 seconds

The power spectrum that results from an FFT gives the amplitude of power as distributed across evenly spaced frequencies. The frequency of the notes on a musical scale are best represented on a logarithmic scale. We derive the power dissipated over the interval that occurs half of a semitone above and below each note. The note frequencies are taken from the even-tempered scale (see "The Science of Musical Sounds", Johan Sundberg, Academic Press,1991pg 89). The useful range of frequencies from audio sampled at 22KHz spans from 55 Hz to 11 Khz. A more typical

window selects frequencies between 150Hz and 4KHz. One should note that binning as described still gives complete coverage of the frequency range, and thus all power within the range is represented. In other words there aren't any holes between notes where anharmonic sound goes unrepresented.

Once the power is binned over the note intervals, we have separated our signal into discrete frequencies of effectively continuous (finely discrete) power dissipation.

We now mark events at discrete times, which will yield an amplitude at a discrete frequency and time. A series of running averages of the power are maintained at each frequency. Each average is some factor n (typically 4) times longer than the previous average for a given frequency, the shortest average being typically 5 time units, or about 0.25 seconds. Events are then recorded at times where each average crosses the next slower average. For example, above we chose time units of 1/21.5 seconds. One class of event that will be recorded for each frequency is when the average power of the last .25 seconds crosses the average of the last second. Further classification specifies whether the fast average dropped below or rose above the slow average. An event is recorded by the amplitude of the fast average at the time of crossing, the frequency, the time, and the event class. Events are then separated into classes according to which average was responsible for the event, and whether the average was falling or rising.

To derive sufficiently discriminating keys, we combine several events together. The method of selecting which events to combine is as follows. From the stream of events described above, the events are grouped by a time interval, typically about 1/2 to 3/4 seconds. All such events within this time range are considered to have occurred at the same time. This additional time grouping was found to be necessary to compensate for distortions that occur when music is recorded onto magnetic tape and redigitized. For each time group then, the events may be removed if they are beneath a minimum threshold in amplitude, or are outside the desired frequency range.

In many cases percussion-like sounds in the audio stream trigger a disproportionate number of events. These sounds are characterized by a series of events occurring at adjacent frequencies at

the same time. A way to simplify the event stream is to scan for a threshold number of events adjacent in frequency occurring at the same time, and remove all but the loudest (higest amplitude). This can bring the proportion of events generated by percussion-like sounds down to the level harmonic sounds.

We now derive keys from combinations of events. Keys will encode the local neighborhood of events, centered around a particular frequency. A series of key generators are created, one for each frequency in the allowed range. Each key generator represents a frequency, which will be a part of each key it generates. The assigned frequency is called the fundamental frequency of the key generator. A key generator keeps track of the most recent events in the neighborhood of its fundemental frequency. Typically, the last 5 or 6 events are kept. This determines how many events will be combined into each key. Key generators receive all events that occur within the neighborhood of their fundamental frequency. The neighborhood is typically +- 5 semitones.

Within the key generators, events are organized into layers, one layer for each time group. At the beginning of a time group, provided there is at least one event in the neighborhood, the layers are rolled forward. That is, the events at the oldest time group are cleared, and events for the new time group are then recorded in the cleared layer.

For a key generator to generate any keys for a given time group, a condition must be met. An event has to occur at the fundamental frequency of the key generator. In the absence of such an event, the neighborhood is preserved, but no keys are generated. Incoming events will roll forward the history each time group, until such time the condition is met.

When a condition is met for a given key generator, keys are formed from considering combinations of events over the local event history maintained by the key generator. Only events in different layers are combined. The key is composed of the fundamental frequency, and the frequencies of one selected event from each layer. For example, if events from the last five time groups are maintained, the key corresponds to the fundamental, and 4 selected events, one from

each layer. One may also use the time information that each event occured for further discrimination of the keys.

In one embodiment, all possible combinations across layers may be generated. This however, may give too many keys to be practical in large databases. An alternative is to generate only the loudest combinations. That is, if only the loudest event from each layer is selected, where loudness is determined by the amplitude at the time the event was taken, then only one key is generated per key generator per time the firing condition is met. This may have problems generating enough density for a reliable signal (the strength of the match) to be maintained thoughout the song. An alternative embodiment begins by taking the farthest neighbors in any one direction, and as the combinations are examined, only increasingly louder combinations are accepted. This provides a systematic means of compromise, and can provide sufficient density for a fairly uniform, reliable signal. Other selection rules may be applied.

For each time group the resulting keys from all key generators are pooled together. The pool of keys is sorted on the sum of the amplitudes of the events in each key. From this pool, the top N keys are selected, where N is the maximum feature rate, or features per time group.

For each key selected for storage, the time offset of the event corresponding to the fundamental frequency of the originating key generator is stored, along with an ID of the piece of music. In the storage phase, keys and data are stored in a multimap. In the retrieval phase, the above process of feature extraction is repeated, but rather than store the keys in a multimap, the keys are used to retrieve all records in the multimap with the same keys as the query.

For each retrieved key, a transformation is computed by subtracting the time offset of the query key from the stored key. A modification of method of Germain and Califiano may be used for signal integration from consistent transformations arising from independent correspondences (see Germain R, Califano A., Colville, S; "Fingerprint Matching Using Transformation Parameter Clustering" IEEE Computational Science and Engineering Oct-Dec 97 V 4 N 4 pg 42 and U.S.

Patent No. xxxxxx) with the exception of the transformations being simple 1D difference as oppose to a 2D transformation.

Pattern matching in streams required is distinct form static matching. Signal strength has two components, both magnitude and duration. The matching process must continually take a new sample of the stream and issue a query to the retieval system. The instantaneous strength of the match mad be tallied by the application of some objective function of the number of hits returned by the retrieval system with the same alignment offset. To capture strength over duration, some degree of blending the current results with recent results is required.

An example method is to include some fraction of a previous match to a current match if they are present at recent moment in time. This allows a match to gain strength the longer it is present in the stream. This is a key method in separting the true matches from spurious matches. Other ways of combing past results with the present may be applied.

3. If the same advantage or problem has been identified by others (inside/outside IBM), how have those others solved it and does your solution differ and why is it better?

Digital watermarking is a competing technology, which if unaltered works well. Since watermarking recognition relies on the integrity of the watermark, the strength of the method relies on the watermarks resistence to attack. Thus far, all such watermarks have been shown to be rendered disfunctional.

Others have matched audio for TV media with a different feature scheme (see patent #5,504,518), but have not done so for music. Musclefish.com matches sound snippits based on statistics, but scalability is a problem due to whole piece distances. It is not suitable for streaming media because of its use of statistics on the whole piece. Others have developed similarity search engines that operate on the musical score (see "Melodic Similarity - Concepts, Procedures, and

Applications" Computing in Musicology 11 W. B. Hewlett, Ed. Selfridge-Field, E. MIT Press 1998). No such system exists that matches directly on the digital audio stream.

WHAT IS CLAIMED IS

1. A method of constructing an intrinsic feature ("key") of a portion of a recording of audio signals, said method comprising the steps of:

a) carrying out a Fourier transformation of the audio signals of said portion into a time series of audio power dissipated over a first plurality of frequencies,

b) grouping said frequencies into a second, smaller, plurality of bands each comprising a range of neighbouring frequencies,

c) integrating power dissipation in each said band over a selected time period,

d) detecting power dissipation events in each said band,

e) grouping together said power dissipation events from mutually adjacent bands at a selected moment to form said intrinsic feature.

2. A method as set forth in Claim 1, wherein each said power dissipation event comprises a crossover of rolling energy dissipation levels over time periods of differing lengths.

3. A method of determining whether an audio stream comprises a portion of a prior recording of audio signals, comprising the steps of:

a) storing a first intrinsic feature in a database, said first intrinsic feature being constructed in accordance with Claim 1 from said portion of said prior recording,

b) constructing a second intrinsic feature in accordance with Claim 1 from a portion of said audio stream,

c) comparing said first intrinsic feature with said second intrinsic feature to determine whether there exists a selected degree of similarity between them.

4. A method as set forth in Claim 3, wherein each said power dissipation event comprises a crossover of rolling energy dissipation levels over time periods of differing lengths.

5. A method for matching extended streams of audio by integration of a plurality of matching intrinsic features ("keys"), constructed in accordance with Claim 1, of each stream, that give rise to a consistent alignment between the two streams.

PROVISIONAL APPLICATION COVER SHEET

This is a request for filing a **PROVISIONAL APPLICATION** under 37 CFR 1.53(b)(2).

DOCKET NUMBER	YOR920000784	Type a plus (+) inside this box	+

INVENTOR(s)/APPLICANT(s)

LAST NAME	FIRST NAME	MIDDLE INITIAL	RESIDENCE (City and either State or Foreign Country)
Abrams Fitch Germain Pitman	Steven Blake Robert Michael	G. S. C.	

TITLE OF THE INVENTION (280 characters max)

FEATURE-BASED AUDIO IDENTIFICATION

CORRESPONDENCE ADDRESS

Casey P. August; IBM Corporation; Intellectual Property Law Dept.;
P.O. Box 218; Yorktown Heights, New York 10598

STATE	New York	ZIP CODE	10598	COUNTRY	USA

ENCLOSED APPLICATION PARTS (check all that apply)

- [X] Specification — Number of Pages: 9 — [ ] Small Entity Statement
- [X] Drawing(s) — Number of Sheets: 0 — [ ] Other (specify):

METHOD OF PAYMENT (check one)

[ ] A check or money order is enclosed to cover the Provisional filing fees [X] The Commissioner is hereby authorized to charge filing fees and credit Deposit Account Number 09-0468	**PROVISIONAL FILING FEE AMOUNT ($)**	$150.00

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

[X] No

[ ] Yes, the name of the U.S. Government agency and the Government contract number are:

_____

Respectfully submitted,

SIGNATURE _____ Date: _____

TYPED or PRINTED NAME Manny W. Schecter Registration No. 31,722

[ ] Additional inventors are being named on separately numbered sheets attached hereto.

PROVISIONAL APPLICATION FILING ONLY

Appendix D

Copy of Applicant's Priority Application

NETWORK: **NBCN**

SERIES TITLE: CHASE CHAMPIONSHIPS TENNIS
PROGRAM TITLE: MADISON SQUARE GARDEN
PART NUMBER:

AIR DATA:	11/21/99	PROGRAM TYPE:	SPORTS	SYNDICATOR NO:	
AIR START:	14:00:00	VERSION TYPE:		PRODUCER:	
AIR END:	15:59:00	PRODUCTION NO:		DISTRIBUTOR:	
LENGTH:	1:59:00	EPISODE NO:			

1	SUNAMERICA THEME SEGMENT THEME	0:15	TI	FRANK CALANZARO ASCAP 100%	NBC MUSIC LIMITED ASCAP 100%
2	CYMBAL PYRAMID HIGHLIGHTS	2:30	BI	PHIL GARROD, REEDHAYS, SCOTT P. SCHREER BMI, BMI, BMI 33%, 33%, 33%	NBC OLYMPICS VENTURES MUSIC BMI 100%
3	SUNAMERICA THEME SEGMENT THEME	0:10	TI	FRANK CALANZARO ASCAP 100%	NBC MUSIC LIMITED ASCAP 100%
4	NBC FRENCH OPEN THEME OPENING THEME	0:40	TO	PHIL GARROD, REEDHAYS, SCOTT P. SCHREER BMI, BMI, BMI 33%, 33%, 33%	NBC OLYMPICS VENTURES MUSIC BMI 100%
5	NBC FRENCH OPEN THEME HIGHLIGHTS	0:15	BI	PHIL GARROD, REEDHAYS, SCOTT P. SCHREER BMI, BMI, BMI 33%, 33%, 33%	NBC OLYMPICS VENTURES MUSIC BMI 100%
6	OVERPOWERED FEATURE STORY	0:40	BI	FRANK CALANZARO ASCAP 100%	CALANZARO MUSIC ASCAP 100%
7	FOOTAGE	0:40	BI	FRANK CALANZARO	CALANZARO MUSIC, INC.

FIG. 1

VRS	VRS	76	2CA	NBCN	3 NET
MCD	MCD	76	1ARIS1000029841	NBCN	20000507135431-0500000012 N N

F2	F3	CODE TYPE	ENCODED NO
VBS	76	1ARIS	1000029841

YEAR	MN	DA	HR	MN	SC	ZULU	DURATION CAL
2000	05	07	13	54	31	-0500	0:00:12

N1	N2	N3
2CA	NBCN	3NET

TITLE	**ROUNDBALL ROCK**
PERFORMER	JOHN TESH MUSIC
CALC COMPOSER	JOHN TESH
CALC COMP SOC	BMI
CALC PUBLISHER	TESH MUSIC
CALC PUB SOC	BMI

DATE	TIME	TIME	DURATION
SUNDAY, MAY 7, 2000	13:54:31	1:5431 PM	0:00:12

PROGRAM TITLE	NBA ON NBC
USE	BI
USE DISCRETION	BUMPER
TITLE	ROUNDBALL ROCK
PERFORMER	JOHN TESH MUSIC
CALC PUBLISHER	JOHN TESH
CALC COMP SOC	BMI
CALC PUBLISHER	TESH MUSIC
CALC PUB SOC	BMI
NETWORK	NBCN

FIG. 2

MUSIC CODE DETECTION COMPOUND FIELD VALUES

FIELD	START	SIZE	DESCRIPTION
RECORD HEADER	1	16	CONTENT ID DETECTION DESCRIPTION.
CONTENT CODE TYPE	17	4	TYPE OF CODE USED FOR IDENTIFYING CONTENT.
CONTENT CODE	21	20	CODE IDENTIFYING DETECTED CONTENT.
DETECTION DATE	41	8	DATE ON WHICH DETECTION BEGAN
DETECTION TIME	49	11	TIME AT WHICH DETECTION BEGAN
DETECTION DURATION	60	6	DURATION OF CONTENT OVER WHICH CODE WAS DETECTED.

FIG. 3

SOURCE COMPOUND FIELD VALUES

FIELD	START	SIZE	DESCRIPTION
RECORD HEADER	1	16	RECORD TYPE.
AUDIO MEDIUM ID	17	4	AUDIO BROADCAST MEDIUM.
BROADCAST IDENTIFIER	21	8	BROADCAST IDENTIFIER SUCH AS CALL SIGN OR SERVICE NAME.
BROADCAST FREQUENCY/ CHANNEL	29	6	STATION BROADCAST FREQUENCY OR CHANNEL.
STATION FORMAT	35	2	STATION BROADCAST FORMAT.

FIG. 4

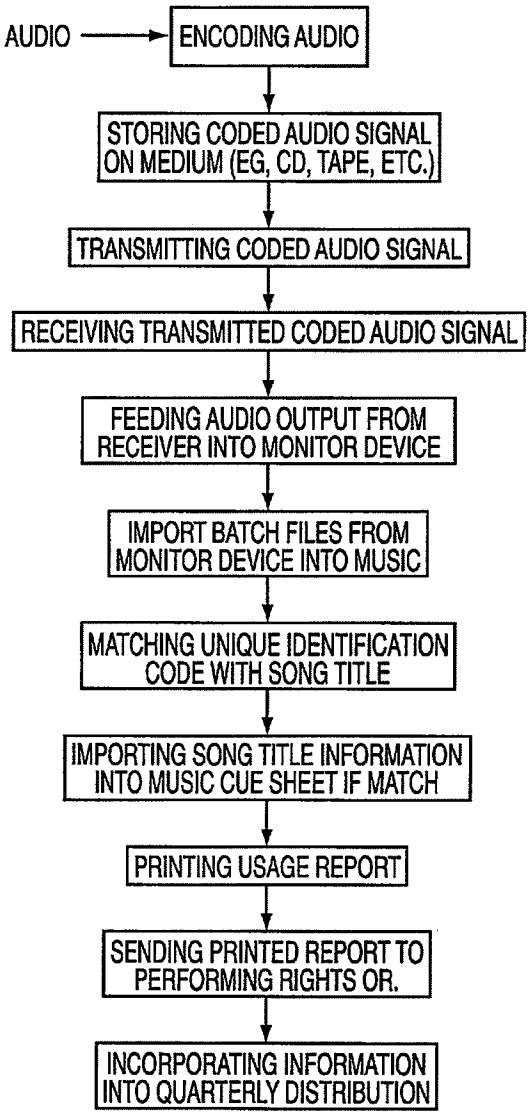

AUDIO
ENCODING AUDIO
STORING CODED AUDIO SIGNAL ON MEDIUM (EG, CD, TAPE, ETC.)
TRANSMITTING CODED AUDIO SIGNAL
RECEIVING TRANSMITTED CODED AUDIO SIGNAL
FEEDING AUDIO OUTPUT FROM RECEIVER INTO MONITOR DEVICE
IMPORT BATCH FILES FROM MONITOR DEVICE INTO MUSIC
MATCHING UNIQUE IDENTIFICATION CODE WITH SONG TITLE
IMPORTING SONG TITLE INFORMATION INTO MUSIC CUE SHEET IF MATCH
PRINTING USAGE REPORT
SENDING PRINTED REPORT TO PERFORMING RIGHTS OR.
INCORPORATING INFORMATION INTO QUARTERLY DISTRIBUTION

FIG. 5

12-15-00

A

ROSENMAN & COLIN LLP, 575 Madison Avenue, New York, New York 10022-2585

EXPRESS MAIL number EL545192295US Deposited December 14, 2000

I hereby certify that this paper or fee is being deposited with the United States Postal Service as "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Commissioner of Patents and Trademarks, Washington, DC 20231

Shahan Islam

COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, DC 20231

JC962 U.S. PTO
12/14/00

Docket No.: 3003/MML
Date: December 14, 2000

JC825 U.S. PTO
09/736874
12/14/00

Sir:

Transmitted herewith for filing is the patent application of Scott SCHREER
(Name(s) of Inventor(s))

FOR: SYSTEM AND METHOD FOR ACCESSING AUTHORIZED RECORDINGS
(Title of Application)

ENCLOSED ARE:

(X) **Specification** (9 pages), Claims (3 pages/11claims) & **Abstract**: Yes X 5 Sheets of Drawing(s);
(X) **Declaration and Power of Attorney** EXECUTED? Yes X No
(X) **Assignment to** Freeplay Music, Inc. of 630 Ninth Avenue, New York, NY 10036
( ) Certified copy of _____ filed on:
the priority of which is claimed under 35 USC 119;
( ) Verified Statement to establish **Small Entity Status** under 37 CFR 1.9 and 1.27
( ) Information Disclosure Statement, PTO-1449 and _____ references;

THE FILING FEE HAS BEEN CALCULATED AS SHOWN BELOW:

	Claims filed	Extra	SMALL ENTITY or LARGE ENTITY	
Basic Fee			$	$ 355.00
Total Claims	11 – 20 =	X 18	$	$ 0.00
Indep. Claims	1 – 3 =	X 80	$	$ 0.00
Multiple Dep. Claim Presented?			$	$ 0.00
Total Filing Fee			$	$ 0.00
Assignment recordal fee ($40.00):			$	$ 40.00
PLEASE CHARGE:			$	$ 395.00

( ) Enclosed is check(s) for the fees indicated above.

The Commissioner is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. **50-1290**. A duplicate copy of this sheet is enclosed.

(X) The fees indicated above.
(X) Any additional filing fees required under 37 CFR 1.16.
(X) Any filing fees under 37 CFR 1.16 for the presentation of extra claims.

The Commissioner is hereby authorized to charge payment of the following fees during the pendency of the application or credit any overpayment to Deposit Account No. 50-1290. A duplicate copy of this sheet is enclosed.

(X) Any additional filing fees required under 37 CFR 1.17.
(X) Any filing fees under 37 CFR 1.16 for the presentation of extra claims.

Respectfully submitted
for Applicant,

Shahan Islam
Reg. No. 32,507

Rosenman & Colin LLP
575 Madison Avenue
New York, NY 10022-2585 Tel: (212) 940-8564

SYSTEM AND METHOD FOR ACCESSING AUTHORIZED RECORDINGS

RELATED APPLICATIONS

This is a non-provisional counterpart to U.S. Provisional Application Serial No. 60/207,390, filed on May 26, 2000.

FIELD OF THE INVENTION

The present invention relates generally to a music library production business; and, more particularly, to a system and method for accessing authorized recordings in which recordings are provided to major market end-user organizations under the terms of a no-charge license agreement and derives its revenues from performance fee generated when the recordings are broadcast in order to protect the recordings from being illegally copied.

BACKGROUND OF THE INVENTION

The music licensing industry was created to ensure that songwriters, composers, lyricists and music publishers receive royalties to which they are lawfully entitled when their copyrighted musical creations are publicly performed. In broad terms, licensed music is categorized according to how, where and when the music is used, and how it is performed. License categories include: live concert music, album-oriented music, production music (used in radio and television broadcasts, etc.), feature work music (television broadcasts), background and foreground music (used in public places such as arenas, stadiums, hotels, shopping malls and restaurants), etc.

Television production companies, major broadcasters and cable networks use music to score the programs they broadcast to make their content more dramatic, interesting and entertaining. Although original music can add tremendously to their programs, quite often, time and financial constraints prohibit its use. In order to satisfy this need, a large and growing collection of musical compilations have been created which offer these organizations a variety of musical styles, sound effects and formats that satisfy virtually every production requirement. These compilations or "music libraries" fall into a category of the music licensing industry known as production music. Although precise breakout figures are not publicly available due to category crossovers and limited financial reporting, it is estimated that royalties for the production music segment are at least 15% of the music licensing industry's total annual distributions and possibly much higher.

The production music market segment is highly fragmented. It is composed of dozens of producers offering, perhaps, hundreds of different music libraries. The segment is dominated by a handful (approximately twenty-five) of large, well-capitalized companies, ten of which can be considered premiere. The rest of the library producers in the segment are small "mom and pop" operations; many run as side businesses by performing musicians, with small libraries, usually of mediocre quality, that do not generate significant revenues and performance royalties.

Currently, music library producers are mainly dependent upon the "front-end" creative synchronization and user use fees paid by end-user organizations for the bulk

(approximately 80-85%) of their revenues. The rest of their revenues come from the "back-end" performance royalty fees they receive from the performance rights organizations. Due to the inexactitude of passive recognition systems and suspected non-compliance of broadcast information reporting by end-user organizations, it is universally agreed that music library composers and publishers do not receive all of the performance fees to which they are entitled. Furthermore, there is a widespread belief in the music library production business that the allocation and distribution of performance fee revenues by the performance rights organizations will not change until technical advances make the detection and reporting of proof of performance information more accurate, timely and comprehensive.

Due to the cost structure imposed upon them by the current music library business model, most broadcast television and cable networks and television production companies limit the number of libraries that they license, or they elect to pay for their music on a per use or needle drop basis.

Therefore, it is required an improved mechanism which imposes a substantial administrative responsibility upon the above companies to maintain accurate records concerning the music libraries the companies have licensed, and, in addition to the financial impact and administrative burden, exposes the end-user organizations to potentially significant legal liabilities if they use music that has not been licensed.

SUMMARY OF THE INVENTION

It is therefore an object of the invention to provide a system and method for accessing authorized recordings in which composers and publishers receive all or substantially all of the performance fees to which they were entitled.

A further object of the invention is to create a music catalog record or cue sheet that is acceptable to music publishing companies such as Broadcast Music Inc. (BMI), SESAC, Inc. (SESAC) and American Society of Composers, Authors and Publishers (ASCAP), and other performance rights organizations.

Another object of the system and method is to reduce the administrative responsibility on television and cable networks and television production companies to maintain accurate records concerning the music they have licensed and decrease end-user organization liabilities if it uses music that is not licensed.

Another objective of the invention there is to create and drive new industry paradigms regarding:

i) incentives for end-user organizations to use music in their broadcast productions; and

ii) how music publishers and composers will be paid for the use of the copyrighted material contained in their libraries.

These and other objectives of the invention, which shall become hereinafter apparent, are achieved by the present system and method for accessing authorized recordings. The system and method provides the high quality, comprehensive music which the industry needs to run its businesses and minimize the administrative headaches previously associated with performance reporting. Importantly, it eliminates traditional mechanical, synchronization and master recording fees, while at the same time, promotes building the user's market share. These goals are achieved while attaining extremely high levels of accuracy in collecting royalty payments. The System and Method herein provides its music to major market end-user organizations under the terms of a no-charge license agreement and derive its revenues solely from performance fees generated when they broadcast music.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects and features of the present invention will become apparent from the following description of preferred embodiments given in conjunction with the accompanying drawings, in which:

Fig. 1 represents a music catalog record of various musical themes broadcast during a televised tennis match.

Fig. 2 represents a single sample record of a work monitored from a coventional radio broadcast. The top panel represents data imported from a musical work library database. The bottom panel represents the data derived from the embedded identification code.

Fig. 3 is a summary of the object /string breakdown as is relates to the types of information within the music monitoring and identification code.

Fig. 4 is an example of a source detail record.

Fig. 5 is a flow-chart illustrating the steps of the method comprising the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The System and Method will be described herein as follows.

The first step of the System and Method is to encode audio using "watermark" or similar technology which embeds a unique identification number into the audio signal. This is done by either importing the music content from a digital file or converting the audio through an analog to digital (A/D) converter into one's computer.

The digital audio file is then opened in the encoding software and assigned a unique identification code. Once the encoding process is executed, a new file is created with the unique identification number embedded in the audio signal.

The audio file is then copied or played back and recorded on a CD, cassette, videotape, etc. When the encoded audio is broadcast and received by a monitoring station, the unique identification is recognized and recorded along with the date, time it was detected, along with the duration it played. The detections are then compiled (as specified by user) into a "batch file."

The next step is the importing of the batch files into a database that catalogs the transmission and performance data. The batch files were created by a software monitoring system that detects a unique identification code embedded in the audio signal of a composition, as well as records the date, the time, the duration, and network information. The top of Figure 2 is a printout of the raw data that has been imported into the music catalog database. Here, it is very easily seen how a compound object is broken out into year, date, month, duration, etc.

The information is then decoded after importing the records from the monitoring system into the The MCD (music code detection) object/string is broken down as follows. As seen in Figure 3 which is an example of a table of technology data interchange file format specification, the record header starts at 1 and is 16 characters. The next bit of information is the content code type which starts at character 17 and is four characters long. There is also the content code which starts at character 21 and is 20 characters long. A detection date starts at character 41 and is 8 characters long. The detection time starts at character 49 and is 11 characters long. The detection duration is started at character 60 and is 6 characters long. The duration measurement method starts at character 66 and is 3 characters long. The overlap starts at character 69 and is one character long.

The Source Detail Record object/string is broken down as follows. The record header (see Figure 4) starts at character 1 and is 16 characters long. The audio medium ID starts at character 17 and is 4 characters long. The broadcaster identifier starts at character 21 and is 8 characters long. The broadcast frequency channel starts at character

29 and is 6 characters long. The station format starts at character 35 and is 2 characters long.

The unique identification number from monitoring station is then taken and matched up with the song title in the "music library database" that has that same identification code.

When those two unique identification codes match up, the song title information from the music library is then imported into a music catalog . As seen in earlier Figure 2, from the title "Roundball Rock" down, is the information that was imported from the music library such as the title, performer, composer, composer's society, publisher, publisher's society.

To finalize the music catalog , if the program information is not provided by a monitoring device, one would select or input manually the program title, use and usage description from a pull down menu and/or look-up table for each music detection.

Other optional aspects of the system may include "buttons" which open related databases that contain information such as composer and composer's societies, and composers splits and percentages which can be selected from a pull down menu and automatically imported an object of a music library. Another category may be styles of music such as rock, jazz, etc., the tempo of the piece of music, lead instruments that are used, etc. Key words and descriptions and filters could be used for searches.

Referring Fig. 1, there is described an example of a music catalog record or cue sheet, which may be printed out. A cue sheet is a report of the usage of the music and includes information such as the publisher, the composer, the publisher's society, the composer's society, the duration of the time that it had aired, the start time, whether it was used as a background or visual performance and a description of that usage.

Figure 5 is a flow chart of the inventive method herein.

Finally, it should be kept in mind that the system and method herein can function not only in connection with music, but with any type of audio and also with video.

The present invention imposes a substantial administrative responsibility upon them to maintain accurate records concerning the music libraries they have licensed, as well as prepare, usually manually, cue sheets that list the title, artist, copyright information, type of usage and time and duration of the music that is played. In addition to the financial impact and administrative burden, the present invention also exposes an end-user organization to potentially significant legal liabilities if it uses music that has not been licensed.

While the preferred and alternate embodiments of the invention have been depicted in detail, modification and adaptations may be made thereto without departing from the spirit and scope of the invention.

WHAT IS CLAIMED IS:

1. A method for embedding an identification code into a digital recording file, and tracking, and cataloging the encoded recording's broadcasts and transmissions, said method comprising the steps of:

embedding an identification code within a digital recording file;

transferring said encoded file onto a digital signal compatible medium;

transmitting said encoded file as an encoded signal;

receiving said encoded audio signal by a suitable digital signal detecting device;

feeding the received and encoded signal into a monitoring means that recognizes the identification code, and records and stores the code and transmission and broadcast related data as a batch file; and

decoding and importing the batch file into a first database that catalogs performance, transmission and broadcast data, and is capable of printing the data.

2. The method of claim 1, wherein the identification code embedded in the audio signal is a digital watermark.

3. The method of claim 1, wherein the step of embedding the identification code is performed by encoding software.

4. The method of claim 1, wherein the identification code is in the form of a non-audible digital signal that is not rendered inoperable by one or more generations of analog taping and broadcast compressions.

5. The method of claim 1, wherein the transmitting or broadcasting is from a radio or television station, including cable and satellite networks and major internet websites.

6. The method of claim 1, further comprising the steps of :

recording and cataloging by the monitoring means, the identification code, the date that the broadcast was monitored; the time of day that the broadcast was monitored, and the duration of the monitored broadcast.

7. The method of claim 1, further comprising the steps of:

searching a second digital work library database to match the embedded identification code with the title of a digital work and its associated file information, and importing said title and associated information from the second database into the first database.

8. The method of claim 7, further comprising the step of:

using the identification code to match the digital work's title to the collected transmission or broadcast related data and printing a digital work usage report having both the title of the digital work and the transmission and broadcast related data.

9. The method of claim 1, wherein the digital recording file is an audio file.

10. The method of claim 1, wherein the digital recording file is a video or multimedia file.

11. The method of claim 1, wherein the data is printed in the form of cue sheets.

ABSTRACT

A method for embedding a digital identification code in a digital recording, and tracking and cataloging the encoded digital recording. The digital signal and the code are received during broadcasts and transmissions. The receiving means has a monitoring means able to recognize and read the embedded code. The monitoring means then records several data, such as time, dates and duration and origin of the broadcasts or transmission. Such data can be retrieved in an easy to read form, thus enabling the end-user to identify the broadcast and transmitted works together with the parameters required to produce accurate royalty reports.

FIG. 1

Network: NBCN

Series Title: Chase Championships Tennis
Program Title: Madison Square Garden
Part Number:

Air Data:	11/21/99	Program Type:	Sports	Syndicator No :	
Air Start:	14:00:00	Version Type:		Producer:	
Air End:	15:59:00	Production No:		Distributor:	
Length:	1:59:00	Episode No:			

1	**SunAmerica Theme**	0:15	TI	Frank Catanzaro	NBC Music Limited
	Segment Theme			ASCAP 100%	ASCAP 100%
2	**Cymbal Pyramid**	2:30	BI	Phil Garrod, Reed Hays, Scott P. Schreer	NBC Olympics Ventures Music
	Highlights			BMI, BMI, BMI 33% 33% 33%	BMI 100%
3	**SunAmerica Theme**	0:10	TI	Frank Catanzaro	NBC Music Limited
	Segment Theme			ASCAP 100%	ASCAP 100%
4	**NBC French Open Theme**	0:40	TO	Phil Garrod, Reed Hays, Scott P. Schreer	NBC Olympics Ventures Music
	Opening Theme			BMI, BMI, BMI 33% 33% 33%	BMI 100%
5	**NBC French Open Theme**	0:15	BI	Phil Garrod, Reed Hays, Scott P. Schreer	NBC Olympics Ventures Music
	Highlights			BMI, BMI, BMI 33% 33% 33%	BMI 100%
6	**Overpowered**	0:40	BI	Frank Catanzaro	Cantanzaro Music
	Feature Story			ASCAP 100%	ASCAP 100%
7	**Footage**	0:40	BI	Frank Catanzaro	Catanzaro Music, Inc

CreationDate [illegible]

VBS

MCD MCD 76 1ARIS1000029841 20000507135431-0500000012 N N

f2	f3	Code Type	Encoded No	Year	Mn	Da	Hr	Mn	Sc	Zulu	DurationCal
VBS	76	1ARIS	1000029841	2000	05	07	13	54	31	-0500	0:00:12

n1	n2	n3
2CA	NBCN	3NET

TITLE Roundball Rock

Performer John Tesh Music

CalcComposer John Tesh

CalcCompSoc BMI

CalcPublisher Tesh Music

CalcPubSoc BMI

Date	Time	Time	Duration
Sunday, May 7, 2000	13:54:31	1:54:31 PM	0:00:12

ProgramTitle NBA on NBC

Use BI

UseDescrition Bumper

Title Roundball Rock

Performer John Tesh Music

Calc Composer John Tesh

CalcCompSoc BMI

CalcPublisher Tesh Music

CalcPubSoc BMI

NetworkR NBCN

FIG. 2

Figure #3

Music Code Detection Compound Field Values

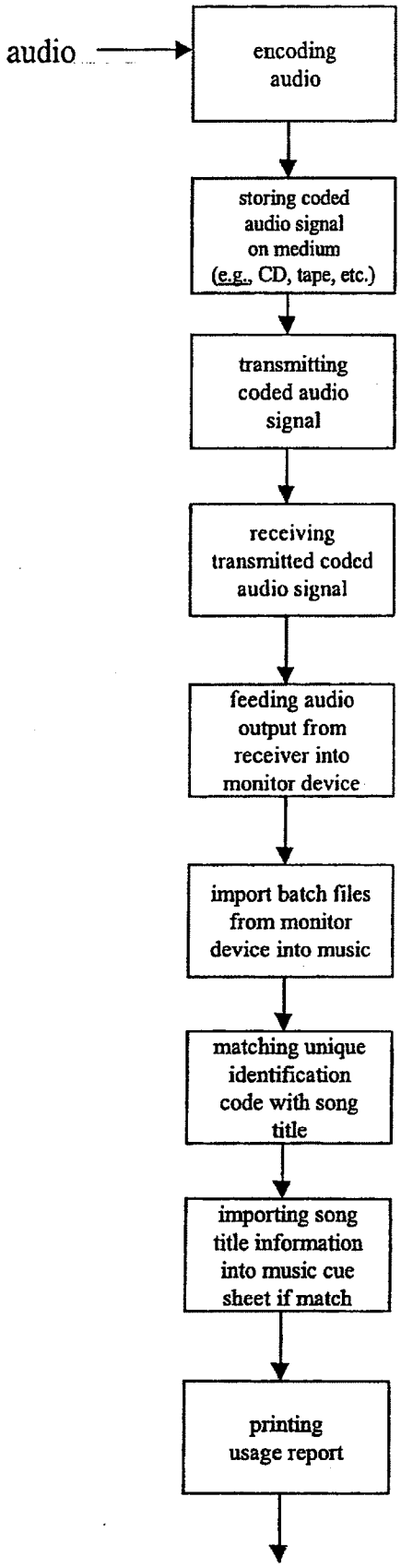
Field	*Start*	*Size*	*Description*
Record Header	1	16	Content ID detection description.
Content Code Type	17	4	Type of code used for identifying content.
Content Code	21	20	Code identifying detected content.
Detection Date	41	8	Date on which detection began.
Detection Time	49	11	Time at which detection began.
Detection Duration	60	6	Duration of content over which code was detected.

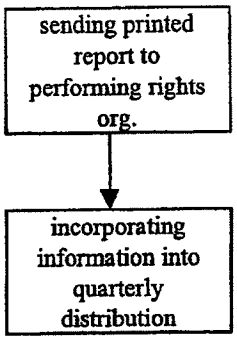
Figure #4

Source Compound Field Values

Field	*Start*	*Size*	*Description*
Record Header	1	16	Record Type
Audio Medium ID	17	4	Audio broadcast medium
Broadcast Identifier	21	8	Broadcast identifier such as call sign or service name.
Broadcast Frequency/ Channel	29	6	Station broadcast frequency or channel
Station Format	35	2	Station broadcast format

Figure #5


audio
encoding audio
storing coded audio signal on medium (e.g., CD, tape, etc.)
transmitting coded audio signal
receiving transmitted coded audio signal
feeding audio output from receiver into monitor device
import batch files from monitor device into music
matching unique identification code with song title
importing song title information into music cue sheet if match
printing usage report


sending printed report to performing rights org.
incorporating information into quarterly distribution

ROSENMAN & COLIN LLP
DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below my name,

I believe I am the original, first and sole inventor (if only one name is listed below), or an original, first and joint inventor (if more than one inventor's name is listed below), of the subject matter which is claimed and for which a patent is sought on the invention entitled SYSTEM AND METHOD OF ACCESSING AUTHORIZED RECORDINGS
Title of Invention

the specification of which: ☒ is attached hereto ☐ was filed on _____ Application Serial No. _____
(for declaration not accompanying application)

with amendment(s) filed on _____
(date(s) of all amendments)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119/§172 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

EARLIEST FOREIGN APPLICATION(S), IF ANY, FILED PRIOR TO THE FILING DATE OF THE APPLICATION			
APPLICATION NUMBER	**COUNTRY**	**DATE OF FILING (Day, Month, Year)**	**PRIORITY CLAIMED UNDER 35 U.S.C. 119/172**
			Yes _____ No
			Yes _____ No
			Yes _____ No

I hereby claim the benefit under Title 35, United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

APPLICATION NUMBER	FILING DATE	STATUS		
		PATENTED	PENDING	ABANDONED
60/207,306 [Provisional]	May 26, 2000		X	

POWER OF ATTORNEY: As a named inventor, I hereby appoint Shahan Islam (Reg. No. 32,507) whose address is **Rosenman & Colin LLP**, 575 Madison Avenue, New York, New York 10022-2585 (e-mail: sislam@rosenman.com) as my attorney, to prosecute this application, and to transact all business in the U. S. Patent and Trademark Office connected therewith.

Send Correspondence To: **SHAHAN ISLAM, ESQ.** **ROSENMAN & COLIN LLP**, 575 Madison Avenue, New York, New York 10022-2585			Direct Telephone Number **(212) 940-8564**
Full Name of 1st Inventor	Last Name **SCHREER**	First Name **SCOTT**	Middle Name **p.**
Residence & Citizenship	City **Westwood**	State or Foreign Country **New Jersey**	Country of Citizenship **USA**
Home Address	No. and Street Address **142 Langner Place**	City **Westwood**	State or Country **NJ** / Zip Code **07675**
Full Name of 2nd Inventor	Last Name	First Name	Middle Name
Residence & Citizenship	City	State or Foreign Country	Country of Citizenship
Home Address	No. and Street Address	City	State or Country / Zip Code
Full Name of 3rd Inventor	Last Name	First Name	Middle Name
Residence & Citizenship	City	State or Foreign Country	Country of Citizenship
Home Address	No. and Street Address	City	State or Country / Zip Code
Full Name of 4th Inventor	Last Name	First Name	Middle Name
Residence & Citizenship	City	State or Foreign Country	Country of Citizenship
Home Address	No. and Street Address	City	State or Country / Zip Code

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signature of 1st Inventor	**Signature of 2nd Inventor**	**Signature of 3rd Inventor**	**Signature of 4th Inventor**
Date 12/14/00 Scott P. Schreer	**Date**	**Date**	**Date**